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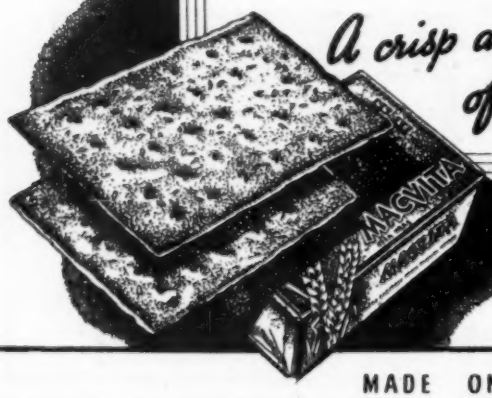

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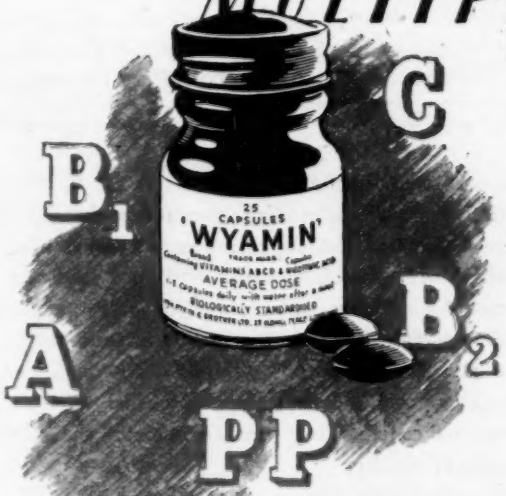

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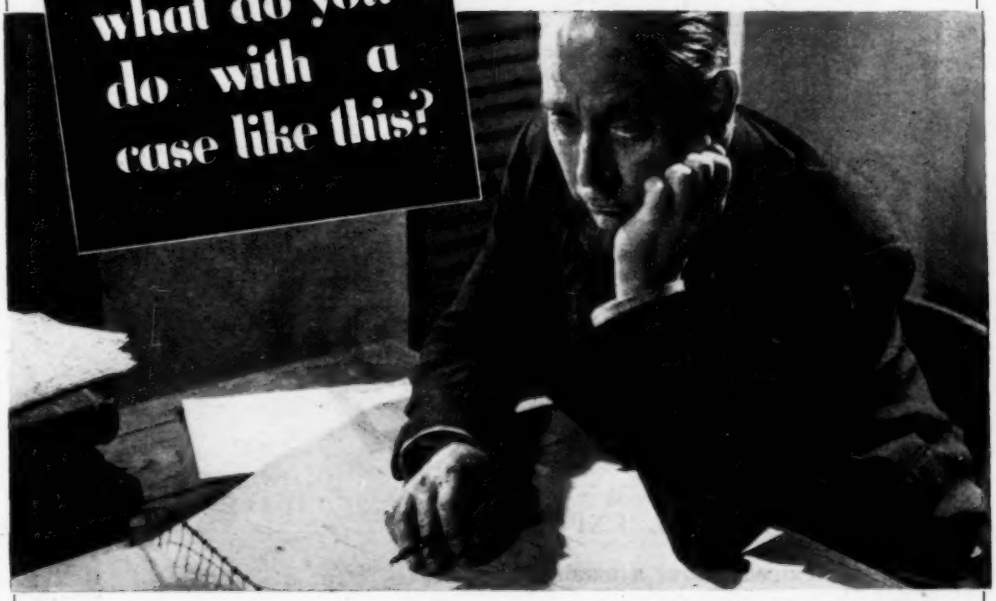

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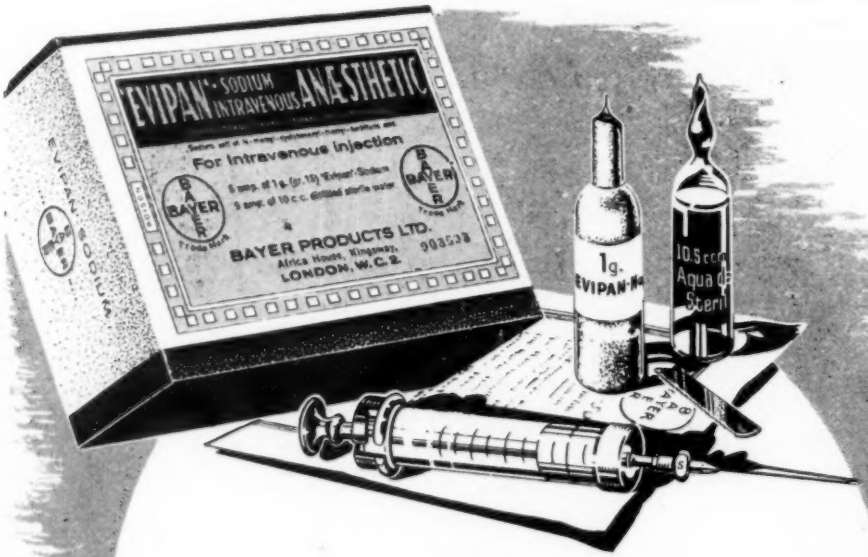

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ORIGINAL ARTICLES

BACTERIAL CONTAMINATION OF CEREBROSPINAL FLUID

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MURIEL M. SMITH,* M.A. CAMB.

A SERIES of cases of meningitis in patients who had been subjected to spinal anæsthesia in the Sheffield Royal Hospital was reported by Barrie.[1] Routine bacteriological examinations of the cerebrospinal fluids, made throughout the epidemic, had proved negative except for three colonies of a gram-negative bacillus on one plate, and towards the end of the series one of us was asked to investigate the condition. In a note contributed to Barrie's paper, we reported that circumstantial evidence indicated a cold-water filter of the Berkefeld type as the probable source of infection. This filter supplied water in which the lumbar-puncture needles, which had been previously sterilised by treatment with formaldehyde, were rinsed before being used. The repeated isolation of a small, actively motile, gram-negative bacillus from samples of the water proved that the filter was faulty. The isolated organism was completely non-pathogenic for laboratory animals; furthermore agglutination tests with the sera of convalescent patients failed to yield any evidence that it was ætiologically related to the outbreak of meningitis. Nevertheless no further cases occurred after the filter had been put out of commission.

We were able to obtain samples of cerebrospinal fluid from only two of the later cases. At the time attempts to isolate an organism from them, by both cultural and animal inoculation methods, were unsuccessful. A spare portion of one of the specimens however was stored in the ice chest at about 4° C. and 16 days later was found to be slightly turbid from bacterial growth. Whether this organism was the causal agent in the series of meningitis cases could not be determined, largely because of its extreme instability in suspension which made satisfactory serological tests with convalescent sera impossible. The facts that it failed to grow on all the usual laboratory media except peptone water and peptone-water agar, and that temperatures above 30° C. completely inhibited its growth, make it much more likely that it was merely an accidental contaminant. Further study left no room for doubt that it was a water organism originally derived from the filtered water used for rinsing the lumbar-puncture needles. While not identical with the bacillus repeatedly isolated from the water it was a closely related strain or species possessing similar morphological and cultural characters and showing some degree of serological relationship. Both organisms were small actively motile gram-negative cocco-bacilli in young peptone-water cultures; they became non-motile and extremely pleomorphic in old cultures, they fermented none of the usual carbohydrates, reduced nitrates to nitrites and failed to produce indole. They could not be identified with any established species.

On inquiry we learnt that the practice of rinsing needles in sterilised water, either to cool them quickly or for some other purpose, is common in many hospitals. The results of the investigation of Barrie's cases indicated that this practice may not only lead to contamination of cerebrospinal fluid at the time of collection but may even constitute a serious danger to the patient. The present investigation was planned in order to determine the frequency with which specimens of cerebrospinal fluid, sent to the laboratory for examination, are contaminated with water-borne organisms which would be missed by the routine bacteriological methods usually relied on and to discover whether the presence of such organisms in cerebrospinal fluid is always attributable to the technique of lumbar puncture employed. It comprises the bacteriological examination of 223 cerebrospinal fluids and of a number of sterilised waters in current use at several different hospitals. Finally a few cerebrospinal fluids were examined which had been specially collected by techniques designed to avoid any possibility of contamination.

* Working with part-time grant from Medical Research Council.

1. Barrie, H. J. *Lancet*, 1941, **1**, 242.

EXAMINATION OF CEREBROSPINAL FLUIDS

Methods.—Cultures were made from all specimens of cerebrospinal fluid received at the laboratory irrespective of the purpose for which they had been submitted. Quantities varying from 4 to 15 drops, according to the amount available, were seeded into duplicate tubes of Witte peptone water one of which was kept at room temperature and the other at 37° C. for 7 days. If either tube showed any opalescence or other sign of bacterial growth within this period stained films and dark-ground preparations were examined and subcultures made on fresh peptone water, digest broth, agar and blood-agar plates. The organisms isolated were investigated sufficiently to place them in one of the groups listed in table II; in many cases definite species identification was simple. No attempt was made to duplicate the tests carried out in the routine department. After sufficient fluid for the peptone-water cultures had been withdrawn specimens were passed on to that department for the examinations required by the clinicians; thus fluids sent in for Wassermann reaction or chemical tests only received no further cultural examination while those submitted for bacteriological diagnosis were cultured on agar and blood-agar plates and the remaining portion of fluid incubated, all at 37° C. and for not longer than 48 or 72 hours. It was no part of our intention to obtain the maximum percentage of positive cultures of all types of organisms by the employment of special culture media or improvements on the routine technique.

Results.—The results obtained by prolonged cultivation in peptone water at both room temperature and 37° C. are summarised and compared with those yielded by the routine tests in table I. While 154 specimens were examined by both methods an additional 69 were cultured in peptone water only. These latter were sent to the laboratory for Wassermann reaction or chemical tests only and were presumably from patients without signs of bacterial infection; their inclusion therefore weighted the chances of yielding positive cultures against the peptone water (P.W.) group in favour of the routine group. Nevertheless the percentages of C.S.F.s giving growth of organisms in the two groups showed no significant difference—43% in the P.W. group against 37% in the routine group. This was so in spite of the fact that meningococci or pneumococci were isolated by peptone-water cultures from only 8 of the 42 specimens which were shown by routine culture to contain these pathogens. If the organisms that were responsible for disease in the C.S.F. donors are excluded from consideration the value of the P.W. technique is strikingly illustrated, 39·9% of fluids giving positive peptone-water cultures as compared with 9·7% giving positive routine cultures. There are several obvious reasons for this difference. The amount of cerebrospinal fluid inoculated into the peptone-water tubes was usually much greater

TABLE I—ISOLATION OF ORGANISMS FROM CEREBROSPINAL FLUIDS

Cerebrospinal fluids	Peptone-water culture	Routine culture at 37° C.
	No. and %	No. and %
Total examined	223*	154
Growth at—		
37° C. only	30	..
RT only	15	..
RT and 37° C.	52	..
Total giving growth ..	97 (43·5)	57 (37)
Organisms isolated—		
Pathogenic	8 (3·6)	42 (27·3)
Contaminant	89 (39·9)	15 (9·7)
Sterile	126 (56·5)	97 (63)
One species only isolated ..	89 (39·9)	54 (35·1)
More than one	8 (3·6)	3 (1·9)

* These included the 154 specimens also examined by routine culture. RT = Room temperature.

than the amount spread over routine plates and P.W. cultures were incubated for 6–7 days instead of the routine 2–3 days. Moreover, it will be seen from table I that 15 specimens of C.S.F. contained bacteria which grew out in culture at room temperature but failed to grow at 37° C. It should be added that many more

TABLE II—TYPES OF ORGANISMS ISOLATED FROM CEREBROSPINAL FLUIDS

Contaminant	PW culture at RT and 37° C. No. (223) and %	Routine culture at 37° C. only No. (154) and %
Water organisms—		
Unidentified species	23 } (14·8)	0
Ps. fluorescens	10 }	0
Staph. albus	33 (14·8)	8 (5·2)
Sarcinæ and *Micrococcus tetragenus*	9 (4)	1
Non-hæmolytic streptococci	4	1
Coliform organisms	11 (4·9)	4 (2·6)
Sporing aerobes	3	3
Proteus vulgaris	1	0
Diphtheroids	0	1
Yeast	1	0
Meningococci and pneumococci	8 (3·6)	42 (27·3)
Nil (specimens sterile)	126 (56·5)	97 (63)

PW = peptone water.

specimens contained organisms which preferred the lower temperature though capable of multiplying to some extent also at 37° C. The majority of contaminated C.S.F.s contained only one bacterial species but a few contained two or even three different species.

Table II shows the different types of organism isolated. The most striking feature is the frequency with which those organisms considered to be water-borne were isolated by P.W. culture (14·8%) and the complete failure of routine culture methods to reveal the presence of contaminants of this nature in any single instance. The water-borne organisms included *Pseudomonas fluorescens* and unidentified species belonging to that genus and to the groups *Chromobacterium* and *Achromobacterium*. Many of them showed some degree of serological relationship by cross-agglutination tests although quite distinct in their morphological and cultural characteristics. Three species were agglutinated by normal human sera to a titre of about 1 in 20; of 9 sera tested all gave the same result.

Apart from the water organisms the commonest contaminants were *Staphylococcus albus* (derived presumably from the skin of either patient or doctor), coliform bacilli and micrococci. Somewhat to our surprise these species also were isolated from a higher proportion of fluids by P.W. culture than by routine culture.

EXAMINATION OF HOSPITAL "STERILE" WATERS

On inquiry at four hospitals in and around Sheffield we learnt that in each of them cold sterilised water was used for rinsing spinal-puncture needles immediately before the operation. Different methods of water sterilisation were employed, not only in the different hospitals but in different units of the same hospital, the technique adopted in each case being traditional. In some instances the job was carried out in the wards by the nursing staff, in others by the hospital laboratory technician, in yet others by the dispensary pharmacist. In no unit was the destruction of all possible contaminants, including resistant spores, ensured by the method of autoclaving the water at increased pressure. Water once treated and labelled "sterile" was considered to be sterile until the bottle was empty, no matter how many withdrawals had been made or what time had elapsed since it had been first put into commission. In several cases the time interval between sterilisation and collection of our sample could not be ascertained; 7 days was the longest recorded.

Eleven samples were obtained, each being collected with a sterile pipette into a sterile test-tube and transported immediately to our laboratory for culture. The technique of peptone-water culture and subsequent investigation was the same as that used for the cerebrospinal fluids. The results obtained are summarised in table III. Six samples were found to be contaminated, the other five were apparently sterile though it is possible that some of them would have given growths had a variety of culture media been used. Contaminated specimens were obtained from all four hospitals. In hospital A, six specimens were taken from different blocks and two of them were found to be contaminated. It is significant that in each of these two cases a special note was made at the time of sampling that the bottle was already half empty.

TABLE III—ISOLATION OF ORGANISMS FROM HOSPITAL STERILISED WATERS

Specimen	Hospital	Characteristics of isolated organisms: Growth	Shape	Gram	Motility	Sugars	Indole	Litmus milk	Pigment	37° C.	RT	Water-sterilisation methods
1	A Block 1	−	..	..	..	..	..	..	..	..	..	Bottle kept for 3 hr. in bath of boiling water. Samples taken 3¼ hr. after sterilisation.
2	A Block 3	+	CB	−	+	−	−	NC	−	+	+ +	Winchester in bath of boiling water. Most of contents already used at time of sampling 7 days after sterilisation.
3	A Block 4	−	..	..	..	..	..	..	..	..	..	Bottle kept for 1½ hr. in bath of boiling water. Samples taken 2 days after sterilisation.
4	A Block 9	+	CB	−	+	−	−	NC	Yellow	−	+	Winchester in bath of boiling water. Half contents already used at time of sampling 2 days after sterilisation.
5	A Block 9	−	..	..	..	..	..	..	..	..	..	Winchester in bath of boiling water. Unused before sampling 5 hrs. after sterilisation.
6	A Cas. dept.	−	..	..	..	..	..	..	..	..	..	Water filtered, then heated in steriliser to 200° C. Samples taken direct from steriliser.
7	B Ward 1	+	CB R	− −	+ −	− −	− −	NC Alk	− Orange	+ + +	+ + +	Tap water boiled in kettle for 5 min.; then poured into a sterilised bottle. Bottle about half full when sampled.
8	B Ward 2	+	CB	−	+	−	−	NC	−	+	+ +	Ditto.
9	C	+	R	−	−	−	−	Alk	−	+ +	+	Autoclaved Winchester filled direct from a Stokes still. Bottle almost empty at time of sampling.
10	D	−	..	..	..	..	..	..	..	..	..	Jug sterilised in a boiler for 20 min. then filled from kettle and covered with jackonette. Full at time of sampling.
11	D	+	R	−	+	−	−	Alk	−	+	+	Glass-stoppered pot sterilised in boiler for 20 min. and filled from kettle. Half contents used at time of sampling 24 hr. after sterilisation.

CB = cocco-bacillary; R = rod-shaped; NC = no change; Alk = production of alkali.

TABLE IV—BACTERIOLOGICAL EXAMINATION OF SPECIALLY COLLECTED CEREBROSPINAL FLUIDS

Specimen	Hospital	Result of culture	Technique of C.S.F. collection
1	A	Sterile	Needle and syringe autoclaved in plugged test-tube. Rubber gloves and mask worn by operator. Patient's skin washed with soap and water, swabbed with spirit and painted with 10% aqueous iodine. Local anæsthetic (2% procaine) injected with autoclaved needle and syringe.
2	,,	,,	
3	,,	Growth +; diphtheroid	
4	,,	Sterile	
5	,,	,,	
6	,,	,,	
7	B	Growth +; 2 different organisms identical with species isolated from sterilised water (no. 7, table III)	Routine technique. Needle rinsed in sterilised water (no. 7, table III) before use.
8	C	Growth +; organism identical with that isolated from sterilised water (no. 9, table III)	Needle kept in spirit, rinsed in sterilised water (no. 9, table III) before use.
9	,,	Sterile	Lumbar puncture performed in operating-theatre with full aseptic precautions. Local anæsthetic given. Needles and syringes sterilised by boiling at time of operation.
10	,,	,,	
11	,,	,,	
12	,,	,,	

All the organisms isolated were similar to some of those obtained from routine cerebrospinal fluids. They were all gram-negative bacilli or cocco-bacilli, indole-negative and fermenting no sugars, but they showed differences in respect of morphology, motility, production of alkali in litmus milk and formation of pigment. Direct proof of the transference of such bacteria from water to C.S.F. at the time of spinal puncture is afforded by the results from waters nos. 7 and 9 (table III) and C.S.F.s nos. 7 and 8 (table IV). These C.S.F.s were collected through needles which had been rinsed in the respective waters and identical organisms were isolated from the corresponding specimens. In the case of water 7 and C.S.F. 7 each specimen contained the same two quite different species.

EXAMINATION OF SPECIALLY COLLECTED CEREBROSPINAL FLUIDS

Of the 89 routine C.S.F. specimens contaminated with non-pathogenic bacteria, rather more than a third contained water-borne organisms and rather less than two-thirds organisms which were mostly derived from skin and clothing (tables I and II). It is clear therefore that the technique of C.S.F. collection in general and hospital practice is unsatisfactory quite apart from the use of so-called sterile water. A small number of specially collected specimens was examined to convince ourselves that sterile fluids can be obtained provided just a little extra trouble is taken. They were supplied from hospitals which had previously sent full quotas of contaminated C.S.F.s to the laboratory for bacteriological diagnosis. The special precautions adopted and the results of peptone-water culture are given in table IV. Two of the specimens (nos. 7 and 8) have already been discussed; they were collected by the old technique and examined in parallel with the waters (nos. 7 and 9, table III) used to rinse the puncture needles. From them the water contaminants were readily isolated. Apart from these one fluid only out of ten gave bacterial growth, the organism being a diphtheroid probably of skin derivation. The use of boiled or autoclaved needles and syringes led therefore, as was expected, to the complete elimination of water contaminants and the application of reasonable standards of cleanliness prevented other contamination except in one instance.

COMMENT

It is clear that spinal puncture is performed in many hospitals, and presumably in private practice also, in light-hearted fashion without the ordinary measures of asepsis which patients and laboratory workers have the right to expect. It is probable that this bad practice leads, as a rule, to nothing more serious than the contamination of specimens withdrawn for laboratory tests, but the possibility of operative infection of the meninges is obvious. This danger is, of course, greatly increased when material such as anæsthetic fluid is injected into the spinal canal.

The practice of using previously sterilised or filtered water for rinsing syringes and needles cannot be too strongly condemned, for it is entirely unnecessary and the contamination of stock water bottles appears to be the rule rather than the exception. The contaminants are mostly species which are usually considered non-pathogenic, but the outbreak of meningitis reported by Barrie strongly suggests that potential pathogens may sometimes be present. The possibility of the transference of infective viruses, like the virus of lymphocytic choriomeningitis, in filtered water, though remote, also merits consideration. The adoption of simple boiling, or better still either oven sterilisation or autoclaving in plugged test-tubes, for the sterilisation of needles and syringes would at once reduce the number of contaminations by over a third and eliminate one of the chief sources of potential infection.

SUMMARY

Of 223 unselected specimens of cerebrospinal fluid 89, or 39·9%, were shown to be contaminated with non-pathogenic organisms by cultivation in simple peptone water at both room temperature and 37° C. Bacteriological examinations of 154 of the same specimens by routine methods revealed contaminants in only 15 or 9·7%.

The peptone-water technique was superior to routine culture for the isolation of almost all types of non-pathogenic bacteria and was essential for the demonstration of water organisms, which accounted for 37% of the contaminants.

Many sterilised waters used in different hospitals for rinsing spinal puncture needles and syringes were found to be contaminated.

Direct evidence was obtained that bacteria may be transferred from such water to cerebrospinal fluid at the time of operation.

Of 10 cerebrospinal fluids collected with reasonable aseptic precautions 9 were bacteriologically sterile and 1 was contaminated with a diphtheroid.

We are indebted to Mr. J. Hardman, Dr. K. J. G. Milne and Dr. H. J. Barrie for their help in the collection of material.

TREATMENT OF AIR-RAID CASUALTIES*

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THE publication of every experience in the reception and treatment of air-raid casualties is of great importance. It is by the pooling and collection of all results, and even impressions, that many gaps in our knowledge will be filled. At a Service hospital there has been a special opportunity for testing planned resuscitation and operative schemes.

RECEPTION AND RESUSCITATION

It was found best to admit patients into resuscitation wards irrespective of their condition, and then filter them through into the operating-theatres or other wards. Patients who were obviously severely wounded were placed in beds on one side of the ward so that they could be examined first. When the first resuscitation ward was full admission was diverted to the second. The patients were placed between warmed blankets and the clothing completely taken off in every case. It was found that delay in taking off clothing results in important injuries being missed, and the thick, often damp clothing cannot be penetrated adequately even by heat from shock cages. Only one examining team was utilised to prevent overlap and confusion, and they moved round the ward methodically examining the cases in strict rotation. A list for operation was made at an early stage, and this enabled the operating-tables to be fed within an hour of receipt

*A more detailed account of these casualties appeared in the *Journal of the Royal Naval Medical Service* for October, 1941, p. 330.

of the casualties. This operating list was of course subject to frequent révision, but unless it was begun early it was inevitable that it would prove difficult to deal with patients in the "safe period." We were impressed with the necessity for examining the whole body from top to toe and it was astonishing how small but serious wounds could otherwise be missed. The best and simplest method of recording injuries was under anatomical regional headings such as head, arms, chest, abdomen, legs and spine.

The average degree of shock encountered in air-raid casualties far exceeded that seen in the casualties of civil life. The nature of the injuries and the state of the blood-pressure were the best signs of its gravity. Early rapid resuscitative measures were strongly advisable. Severe shock had to be tackled whole-heartedly. Besides heat, elevation of the foot of the bed on 18 in. blocks, and intravenous therapy with blood, plasma or reconstituted serum in large doses were necessary. A cannula was always inserted into a vein in cases requiring intensive anti-shock treatment over a long period.

Seriously shocked cases must be given plasma in quantity and given it quickly. It should be possible to run in two pints of plasma in 20 minutes and further quantities up to six pints at rather slower rates as the patient's condition improves. The blood-pressure is usually the best guide to the success or otherwise of plasma- or blood-transfusions. If the systolic pressure does not rise with three pints given quickly it is unlikely that the patient will recover. Patients have been seen with systolic pressures below 50 mm. Hg and have improved at the rate of 10 mm. Hg for each pint of plasma or blood given. It is useful to maintain a sphygmomanometer cuff on the patient's arm throughout treatment and easy to train the ward staff to take the systolic pressure accurately. In certain cases admitted early after injury the blood-pressure was either maintained or raised for a variable period. In such cases the type and degree of injury led one to suspect that a fall was imminent and this could be prevented if plasma was given to compensate for the fall in circulating blood-volume. Oxygen therapy with the B.L.B. mask was frequently used and with obvious immediate improvement in colour, pulse, and depth of respirations. If the patient did not tolerate the mask it usually meant that he did not require oxygen. Many patients asked for it to be reapplied if it was removed. Instruction in the use of the mask had been part of the regular training of the ward staff. Among other adjuncts to the treatment of wound shock are the intelligent temporary splinting of fractures, especially those of the femur; the utilisation of early skeletal traction under local anæsthesia in the ward; and the local blocking of injured limbs with 1% procaine.

Resuscitation measures are only temporary in their effect in most of these cases. Where operation is delayed a patient may reach a peak of improvement and then relapse despite all further resuscitative measures. Patients must if possible be operated on when on the up grade. Approximately 70% of the cases given intense preliminary resuscitation survived operation.

CASES ANALYSED

	Total	Died
Head injuries	35	4
Chest injuries	3	2
Abdominal injuries	8	8
Compound fractures	22	5
Simple fractures	34	0
Bomb splinter wounds of soft tissue	37	0
Laceration of soft tissues	7	0
Burns	8	0
Eye injuries	4	1
Minor injuries	71	0
Unclassified	16	4
Total	245	24

A consecutive series of 245 air-raid casualties aged 20–50 years, most of whom had previously been healthy, are analysed here. Nearly all were admitted within 1–3 hours of the injuries, and all patients admitted alive into the reception wards are included. The death-rates have been calculated up to a period of a week from the day of injury. The total fatality-rate was 10%.

Head injuries include scalp lacerations, concussion and closed or compound fractures of the skull. Altogether there were 35 cases (14% of all cases), 9 being scalp injuries and 12 suffering from concussion. The fatality-rate was 11%. The diagnosis of these head injuries was simple in some cases but in many with other multiple severe injuries the degree of shock made it difficult to assess the cerebral lesion. Accurate neurological examination was often impossible in the early stages of examination. It was made the rule to take every scalp laceration to the theatre for thorough exploration and toilet of the wound. Most of the compound injuries of the skull were due to falling debris, and it should be more widely realised that steel helmets are as useful indoors as out. There were 8 cases of compound depressed fracture of the skull, and 6 were fit for operation, all of which recovered.

Abdominal injuries.—These made a depressing series; there were 8 cases (3% of the total), of which only 4 reached the operating-table and all subsequently died; 3 of these had hopeless lacerations of the abdominal contents and died immediately or soon after abdominal closure. In one case, where the liver had been injured by a bomb splinter, the patient died a few days after operation from a pneumonic infection and a small subhepatic bile-stained abscess.

Chest injuries.—Of the 3 patients admitted with chest injuries 2 were quite inoperable and died shortly after admission. Both these patients had multiple bomb-splinter penetrating wounds with other compound injuries. The one patient who was successfully operated on received a small bomb-splinter wound in his left lower chest and the fragment actually lodged in the right side of the chest. The only operative interference was excision of the entry wound. He subsequently developed a hæmothorax on the right side which was treated by aspiration.

Compound limb injuries and soft-tissue lacerations.—These 65 cases made up 26% of the total. The value of the closed-plaster method was confirmed. Among its other advantages it enabled amputation cases and others to be rapidly transferred to base hospitals. This was found to be particularly important from the patients' point of view, for with the prospects of further nightly raids they were apt to be nervous or sleepless. The wounds were widely and thoroughly excised, sutures were avoided wherever possible, and the wounds packed with Vaseline gauze. By adopting the pattern technique for plastering the limbs much time was saved. A hip spica could be applied in 8 minutes. All cases were examined radiologically before operation; in this way the presence of metal fragments was confirmed and their type and localisation noted, so that the scope of the operation required for excision of the track could be assessed. The small penetrating wounds of fascia with gross damage of underlying muscle were a real danger unless adequately treated. Complete plaster immobilisation was an essential in soft-tissue limb injuries as in compound fractures.

There were 36 cases (14% of all cases) of bomb-splinter wounds of soft tissues, 15 of them involving either the buttock or thigh. The high incidence of such wounds is presumably due to the prominence of the buttocks when people throw themselves down for protection. There were no deaths in the soft-tissue injuries, which included 2 cases of severe local gas-gangrene infections; these recovered after wide local drainage, serum and early immobilisation in closed plaster. There were an additional 7 cases of lacerations due to glass. It was found safe to employ primary suture for these inside 12 hours.

There were 22 compound fractures of the limbs and 8 of these required amputations; 2 patients requiring upper-limb amputation recovered, but 4 out of the 6 patients whose lower limbs were amputated (2 double amputations) died. Subsequent renal failure, with a probable associated cerebral lesion, was responsible for 2 of these deaths. Of the remaining 14 compound fractures, including 4 of the femur, all recovered except one patient with aortic incompetence who collapsed and died suddenly 24 hours after the injury. Of special interest was a case of compound injury to the humerus

in which an acute Volkmann's ischæmic contracture, with all the typical signs, developed 12 hours later. The brachial artery was explored and found to be contracted to a diameter of about ⅛ in. in its entire extent. Peri-arterial sympathectomy and excision of an arterial segment failed to relieve the arterial spasm. Both legs had to be amputated for crush injuries in this case and the patient collapsed and died shortly after the operation.

Simple fractures.—These 34 cases (14% of the total) illustrate the great importance of a specialised knowledge of the treatment of fractures in air-raid cases. The upper and lower limbs received an equal proportion of injuries. A patient with a dislocation of both hip-joints and multiple pelvic fractures was admitted with severe shock (systolic blood-pressure unrecordable) after a heavy mass of concrete had fallen on his sacral region while he was bending down. After resuscitation with 3 pints of plasma, and early skeletal traction through the tibial crests, he recovered.

Burns.—With certain exceptions burns were treated successfully with tannic acid 5% and silver nitrate 10%. This produces a rapid coagulum, an important point when many cases have to be treated. Certain areas were never tanned—the eyelids, lips, genitalia, ears and fingers. Burns of the fingers were treated on light plaster splints in the position of function with Ambrine wax applied on strips of gauze. This method has given excellent healing and good functional results where the initial injury was not too severe. The bad results attributed to tanning methods are more likely due to the initial damage by the burn. The ambrine wax method is, however, much more comfortable, and indeed has been applied to other areas.

Eye injuries.—There were only 4 cases of eye injury and in 2 of these the damage was due to metallic splinters, for which the affected eyes had to be removed. Multiple fine corneal foreign bodies and corneal abrasions accounted for the other 2 cases.

Minor and unclassified injuries.—There were 71 cases of minor injury (29% of the total), most of them having minor lacerations, sprains or slight shock. Many required X-ray examination. In the unclassified list are included 16 patients (7% of the total), several of whom had multiple injuries or had been buried for some time. There were 2 who developed all the signs of a crush-syndrome lesion of the lower limb and recovered, and 4 cases of blast lung, 2 of which were diagnosed by X ray. A stout bronchitic man, with no other lesion except a fractured radius, died after a hæmoptysis which suggested a blast lesion. Included in this unclassified list are 3 patients with multiple bone injuries to the trunk who died shortly after admission.

There were 2 cases of spinal-canal injury. Both were explored and the missiles removed. The one recovered fully but in the other there was damage to the cord with paraplegia.

COMMENT

Antitetanic serum was given as a routine in all wounds including burns; no case of tetanus occurred. Patients with muscle damage were given 8000 units of anti-gas-gangrene serum. No definite conclusions have been reached on the practical value of chemotherapy either generally or locally. During actual convalescence, after the study of a number of blood-counts in a series of cases, it was found that fresh blood-transfusion is of great value in the post-operative period. The importance of close observation of urinary output and renal efficiency must be particularly stressed to the nursing staff, especially in amputation cases and crush injuries. Post-mortem examinations wherever possible are desirable, but owing to administrative difficulties in obtaining the necessary permission much material is being lost.

SUMMARY

In a series of 245 air-raid casualties the mortality was 10%. The use of intensive resuscitation measures was shown to be fully justified in severe cases of injury, and a planned system of resuscitation and treatment is advocated.

Dr. Herbert Spencer, who left an estate of £46,000, bequeathed £3000 to University College Hospital, £3000 to the Medical Society of London, and a residue to the Royal Medical Benevolent Fund.

VITAMIN A AND DARK-ADAPTATION
EFFECT OF ALCOHOL, BENZEDRINE AND VITAMIN C

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THE relation between vitamin A and dark-adaptation depends on three known facts. First, vitamin A is a constituent part of the photosensitive pigment of the rods and possibly also of the cones (Wald 1935, Hecht 1940). Secondly, most cases of night-blindness are cured with vitamin A (Hecht and Mandelbaum 1939, Lewis and Haig 1940, Edmund and Clemmesen 1936). Thirdly, night-blindness can be produced by feeding on a diet deficient in vitamin A (Wald et al. 1938, Booher et al. 1939). All relevant investigations are based on one or more of these facts. Many of the workers who have argued as to their truth have used inaccurate methods of testing dark-adaptation, either of the "recovery-time" type or a similar method (see Dow and Steven 1941 for detailed criticism of these methods). The present study was undertaken in the hope of throwing further light on some aspects of the subject.

Methods.—Dark-adaptation was measured by the apparatus and method described by Yudkin (1941a). The initial part of the curve was obtained by using no neutral screen for the first few minutes. The vitamin-A content of the blood was estimated by the method described earlier (Yudkin 1941b).

The significance of changes in the dark-adaptation curve and the blood vitamin A following any treatment must be considered in the light of their normal variation.

The final rod threshold tested as described on any one subject varied by about 0·2 log unit from day to day, by about 0·1 log unit in a shorter period of a few hours and hardly at all during an hour. The cone threshold, owing partly to the absence of a "fixation spot" in the instrument, varied more than this—i.e., about 0·3 log unit from day to day and about 0·2 log unit over a short period. The rod-cone transition time varied up to about 2 min. from day to day but less than 1 min. on any one day. These variations are not apparently related to fatigue or practice (personal observation) but may be related to changes in the blood-sugar (McFarland and Forbes 1940). Only differences greater than those described can be considered significant in any one case. If, however, there are significant changes in several subjects after a particular treatment this increases the importance of smaller changes in other subjects if they are all in the same direction. Also, if several control tests have been made with any one individual, any change from these may be significant even if less than the normal range of variation. It is worth noting that although the final rod threshold varies in any individual by 0·2 log unit, the total variation among normal people was found to be 0·3 log unit (for definition of "normal" see Yudkin 1941a). It is possible, therefore, for the values for the final rod threshold of an individual to lie in the upper part of the normal (total) range of variation and yet show a significant lowering after vitamin-A therapy.

The resting level of vitamin A in the blood varies by about ± 5% over periods of days or weeks, and it is not affected by food unless this is very rich in vitamin A. These changes may be due to different degrees of adrenal cortical (Malméjac, Chevallier and Choron 1935) or medullary (Thiele and Guzinski 1940) stimulation.

These variations in blood vitamin A and dark-adaptation are quite independent and may be in opposite directions, so that a lower level of blood vitamin A may be associated with a better dark-adaptation curve and vice versa.

EFFECT OF VITAMIN A ON SUBJECTS WITH POOR DARK-ADAPTATION

Effect of a single dose.—Single doses of about 100,000 I.U. of vitamin-A alcohol in gelatin capsules containing 25,000 I.U. each were given on an empty stomach. The effect on the dark-adaptation curve was followed during the next 24–36 hours, or longer if the effect was prolonged, food being taken after 3 hours. The dark-adaptation was measured at 1, 4, 7, 10 and 24

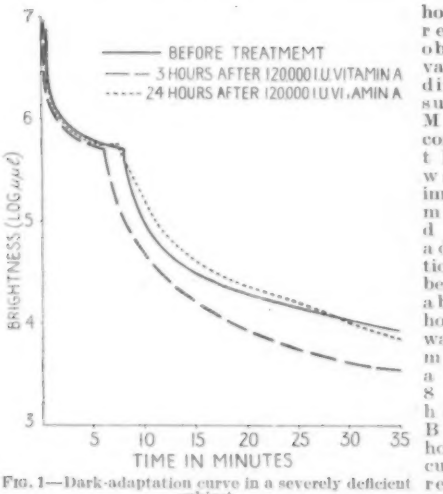

FIG. 1—Dark-adaptation curve in a severely deficient subject.

hours. The results obtained varied in different subjects. Most commonly there was an improvement in dark-adaptation which began in about 2 hours and was maximal in about 8 to 10 hours. By 24 hours the curve had returned to the original state. This transitory improvement was sometimes sufficient to bring the curve of a severely abnormal subject to within normal limits (fig. 1). The final rod threshold, the final cone threshold and the rod-cone transition time were usually all affected.

In one case out of the 24 tested the change was much more rapid, the maximum effect occurring within 2 hours. This recalls the statement by Wald and others (1938) that the effect of a single dose of vitamin A was noticeable in about 30 min. and maximal in 150 min. The difference in rate of response in hemeralopic cases may lie in the different rates at which vitamin A is made available to the retina or in the actual degree of vitamin-A deficiency.

The vitamin A used in these experiments was in the form of the alcohol. Two cases were tested after a dose of a preparation containing mostly esters and the response was no quicker. This was not unexpected in view of the probability that the esters are changed into the alcohol before absorption (Gray, Morgareidge and Cawley 1940).

Although the type of response noted above was the usual one, there were others common enough to be important. The effect was sometimes even more transient than that described, an improvement being found only once in the 24 hours; in other subjects there was no response at any time in the 24 hours. On the other hand in some the improvement was much more prolonged, the return to the hemeralopic state taking several days or even weeks instead of the usual 24 hours.

TABLE I—DOSE REQUIRED TO PRODUCE PROLONGED CURE OF NIGHT-BLINDNESS

Subject	Original threshold (log μμl)	Dose of vitamin A required (I.U.)	Final threshold after cure (log μμl)
1	3·72	650,000	3·42
2	4·11	300,000	3·54
3	3·84	250,000	3·54
4	3·84	1,000,000	3·54
5	4·24	1,600,000	3·54
6	3·72	270,000	3·42
7	3·93	700,000	3·54
8	3·93	2,000,000	3·54

Effect of repeated doses.—Although the different types of response described above were obtained on different subjects, they could all be seen on any single very deficient subject tested after each of several doses (fig. 2). Such a case showed no effect at all after the first two or three doses of 100,000 I.U., then a very transitory reaction was seen. After a few more doses there was the usual improvement and relapse in 24 hours. After still more doses of vitamin A the return to the hemeralopic state took 3–4 days. At this stage a much smaller dose produced a result. With further doses the response to a single large dose lasted a considerable time (weeks or even months).

These results are of particular interest in that each of them has been obtained by different investigators. Thus Hecht and Mandelbaum (1939) found no change in tests done over a period of one day after a dose of vitamin A. More recently they (1940) have found transient responses lasting less than one day. Wald and Steven (1939) showed that an effect occurred bringing a case within normal limits in one day in an experimental deficiency and Lewis and Haig (1940) obtained a response lasting up to 20 days. In view of the results described here, the findings of these workers are not mutually contradictory. The variable response also throws some light on the irregular results obtained by workers who have given comparatively small doses of vitamin A (say 10,000–20,000 I.U. daily) for 3–4 weeks and have tested the cases before and after this. Apart from the use of inaccurate instruments the results may have varied according to how nearly cured the cases were after treatment. Those nearly cured and tested within 24 hours of the last dose would show some improvement, while those still badly deficient or tested more than 24 hours after the last dose might easily show no response.

Tests for deficiency.—We may now discuss what tests should be used to decide whether a case of clinical night-blindness is due to deficiency of vitamin A. Steven and Wald (1941) use the criterion of "threshold lability"—i.e., the fall from a high to a significantly lower final rod threshold after treatment with vitamin A. Theirs is the best test so far, but they do not state the doses used. In view of the facts described above, the test may be improved as follows.

A preliminary dark-adaptation curve is done before any treatment. Large doses (e.g. 100,000 I.U.) of vitamin A are given daily for 10 days and a dark-adaptation test is done 24 hours after the last dose. (An estimation of blood vitamin A on a sample taken about 4–5 hours after any dose would show whether the vitamin was being absorbed.) Most subjects with poor dark-adaptation due to vitamin-A deficiency will by this time respond to a single dose by an improvement lasting more than 24 hours and would therefore show a significant improvement in the dark-adaptation curve. If no response is shown after this dosage another single dose is given and dark-adaptation tests done at intervals throughout the next 24 hours. Subjects with night-blindness due to vitamin-A deficiency would almost certainly show at least a transient improvement at this stage and it could be assumed that no response means that the night-blindness is not due to vitamin-A deficiency. If circumstances permit a test should be done 24 hours after each dose. This would show the first time a response lasted more than 24 hours and so give some idea of the amount of vitamin A required to cause improvement.

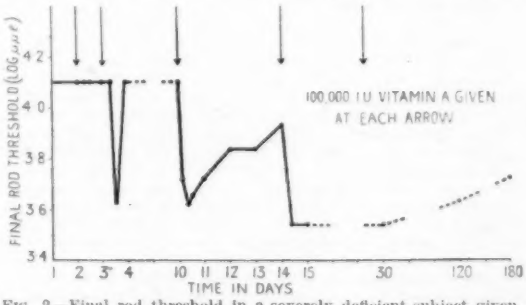

FIG. 2—Final rod threshold in a severely deficient subject given repeated doses of vitamin A.

Of 24 subjects with night-blindness tested by this or similar means all except 3 were improved. Of these 3, 1 showed pathological dilatation of the pupil, another had well-marked diabetic retinitis, and the third had congenital and hereditary night-blindness. Most of the hemeralopic subjects were over 40 years old but apart from the 3 cases mentioned all the dark-adaptation curves could be brought to within normal limits.

Extent of hemeralopia and dose of vitamin A needed for cure.—There was no relation between the degree of night-blindness and the dose required to produce a

prolonged cure. Some subjects with a very high threshold required 300,000–400,000 I.U. while some with only slight hemeralopia required up to 2,000,000 I.U. (table 1).

This may have been due to differences in any of the stages in the metabolism of vitamin A from absorption to the transformation in the retina, or to the possible adaptation of the retina to a low level of available vitamin A over a long period.

BLOOD VITAMIN A AND DARK-ADAPTATION

There are two problems in regard to the relationship between blood vitamin A and dark-adaptation—the general relationship in different individuals, and the relationship in single subjects.

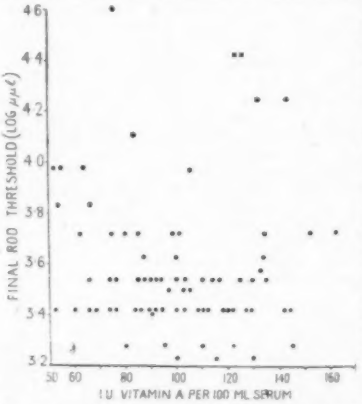

FIG. 3—Blood vitamin A and final rod threshold in 75 subjects.

General relationship in different individuals.—Lindquist (1938) states that when the blood vitamin A is less than 70 I.U. per 100 ml. of serum there is almost always some degree of night-blindness but above this level there is no relationship. Baum and McCoord (1940) on the other hand found no relationship in children. In a group of 75 cases investigated here there was no general relationship. Some of the subjects with less than 70 I.U. per 100 ml. serum had high final rod thresholds (fig. 3) but it is not possible to state definitely that three is a level of blood vitamin A above which all subjects will certainly have a normal threshold and below which they will not. Similarly there is no relationship between the level of blood carotene and the threshold, or between the sum of carotene and vitamin-A content of the blood and the threshold.

Relationship in a single subject.—The results of Pett and Le Page (1940) and Steininger, Roberts and Brenner (1939) in this connexion are difficult to interpret, because both groups of investigators used methods open to criticism. There are two ways of studying the problem: either by following the changes in dark-adaptation and blood vitamin when the diet is deficient in vitamin A, or by testing dark-adaptation and blood vitamin A during dosing with vitamin A. In this work a study of the second type has been made in several cases. The results obtained appear to be of three types, depending on whether the subject was much deficient, slightly deficient or normal. In the first group the vitamin-A content of the blood showed a rapid rise to 400 or more I.U. per 100 ml. serum and a fall to the previous low level by 24–36 hours. The dark-adaptation test of these subjects might or might not show a transient improvement. When an improvement was observed it always occurred later than the maximum rise in the blood vitamin A. In normal subjects there was a similar rapid rise and a fall to the original value in 24–36 hours. With these cases there was, of course, no change in the dark-adaptation curve. The most interesting response, however, was that observed in a partially cured subject.

This patient, originally much deficient, was given several doses of vitamin A and the blood vitamin A and the dark-adaptation studied after each dose. As with other very deficient subjects the blood vitamin A rose rapidly to about 400 I.U. per 100 ml. serum after 5 hours and returned to its original level in about 24 hours after the first three doses. The dark-adaptation showed a transient improvement. The fourth dose produced a more prolonged effect. There was presumably the usual rapid rise of blood vitamin A to a very high level a few hours after dosing; the subsequent fall, however, did not bring it quite to its original low value in 24 hours. The fall continued so that the original value was reached 2 days later. The final rod threshold showed a correspondingly prolonged improvement. Further dosing similarly produced a more lasting effect on both blood vitamin A and the final threshold (fig. 4).

It seems that when the deficiency of vitamin A is partially rectified a dose of the vitamin produces a two-fold change in the level of blood vitamin A. The first is a "flushing" effect—a rapid and considerable rise and fall. After this there is a slower fall which may continue until it reaches its original level.

The results in this case indicate that the improvement in the final rod threshold, though always associated with a rise in blood vitamin A, is related more quantitatively to this less transient level of the blood vitamin (fig. 4). It appears likely, moreover, that a continuation of the dosing would result in a progressively increasing delay in the return of the blood vitamin A and final rod threshold to their original levels. Eventually, with the subject completely cured, this second, slower fall would be delayed indefinitely; he now shows the type of response which occurs in the normal person. It seems, therefore, that in any subject there is a critical level of blood vitamin A below which there is a subnormal rod threshold; and the lower the level of vitamin A in the blood below this critical level, the higher is the final rod threshold within the limits of the normal independent variations of the two. On the other hand, a blood vitamin A higher than the critical level does not affect this threshold.

EFFECT OF ALCOHOL AND BENZEDRINE ON DARK-ADAPTATION

There seems to be a widespread belief that alcohol improves dark-adaptation, though the literature on the subject seems to be limited to two statements. The first is the result of experiments by Clausen and others (1940) on dogs which showed a rise in blood-vitamin A after the administration of alcohol.* The second is the statement of Pett (1940) that after an evening of alcoholic excess many people showed abnormally quick recovery times

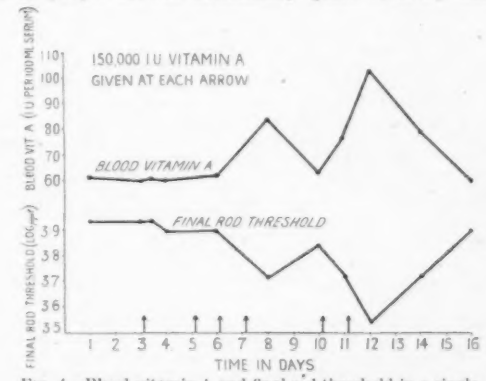

FIG. 4—Blood vitamin A and final rod threshold in a single subject given repeated doses of vitamin A.

on his apparatus. There appears to be no reference to the effect of benzedrine.

The effect of these substances were investigated as follows. Several subjects, some with a high rod threshold, were tested together. The final rod threshold was tested after 25–30 min. in complete darkness (Wald et al. 1938, Yudkin 1941a), continuing if necessary until the threshold was constant. The substance to be tested was then administered and the threshold tested at quarter-hourly intervals afterwards (figs. 5 and 6). The final cone threshold, the rod-cone transition time and the rate of adaptation were then tested together. Having discovered the period during which the substance had most effect on the final threshold, it was given to single cases and a complete dark-adaptation curve carried out at a time that was estimated to bring the whole curve into the period of maximum effect. A normal curve was also done on each case, if possible on the same day, before the test. It was usually impossible to test any particular part of the curve

* Clausen, S. W. and others (*Science*, 1941, **93**, 21) have recently claimed a similar result in humans.

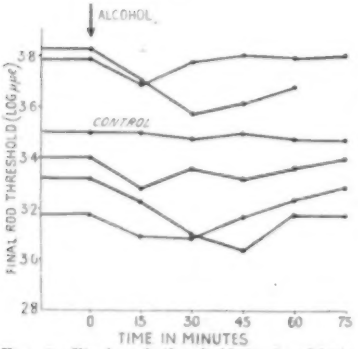

FIG. 5—Final rod threshold in 5 subjects given 20 ml. alcohol and in a control without alcohol.

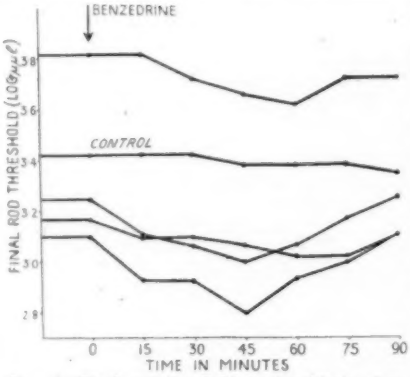

FIG. 6—Final rod threshold in 4 subjects given 10 mg. of benzedrine and in a control without benzedrine.

more accurately than this, for the reaction did not always occur at a definite fixed time. The effect on blood vitamin A was determined by estimating a sample taken before and at the probable time of maximum effect after the substance was given.

Alcohol.—The dose of alcohol used was 20 ml. in the form of 100 ml. sherry. Preliminary testing showed that there was no difference in the reaction whether pure diluted alcohol or sherry was used, so that the more pleasant vehicle was given. The effect of the final rod threshold in five cases is shown in fig. 5. It is seen that there is a definite improvement in each case even when the original threshold was very low. The change begins almost immediately and continues for about an hour.

The effect on the rest of the curve is shown in table II. The alcohol was given half an hour before the test was started. It is seen that the part of the curve showing most change was not always the same, the divergence probably depending on differences in the time of maximum effect of the alcohol. Although the changes were not always significant, even the smaller improvements were in the same direction and there was no curve which was worse after the alcohol. Three cases (12, 13, 14a) showed no effect in any part of the curve by this test. In one of these (14a) the alcohol was given on another occasion immediately before the test, and a significant change occurred in the first part of the curve but passed off in about 20 min. (14b). The other two cases may have shown no response for a similar reason.

There was no significant change in the blood vitamin A in any case. The results varied in both directions and always within normal limits. To emphasise this point—that the improvement does not depend on a concomitant rise in blood vitamin A—two subjects whose normal variations were in the upper part of the normal distribution curve were given 120,000 I.U. of vitamin A and tested at intervals thereafter. There was no definite change in any part of the curves, though the blood vitamin A rose to more than 500 I.U. per 100 ml. serum. These same two subjects showed a significant effect with alcohol.

Benzedrine (amphetamine sulphate).—The dose used was 5 or 10 mg. on an empty stomach, given half an hour before the test. The effect on the final rod threshold is shown in fig. 6, and the rest of the curve in table III. Again the parts of the curve most affected varied in different subjects. Only one of the subjects tested (9) showed no effect in any part of the curve. The blood vitamin A, as with alcohol, showed no significant change. The two subjects who showed no improvement with vitamin A but reacted to alcohol also responded to benzedrine. The effect seemed to be wearing off after an hour and a half. The mental effect was greatest several hours later but two subjects tested at this period showed no change in dark-adaptation.

VITAMIN C AND DARK-ADAPTATION

It has been said (Stewart 1941, Kimble and Gordon 1939) that vitamin C may produce an improvement in dark-adaptation. According to Stewart, who gave 150 mg. daily for 7 or 14 days, the effect was sometimes seen in subjects resistant to vitamin A therapy, while in other subjects it was superimposed on a partial improvement produced by vitamin A. It is not stated whether these subjects were deficient in vitamin C as shown, for example, by "saturation" tests. In the present work no such effect of vitamin C has been observed in any subject. Six subjects with poor dark-adaptation were given 500 mg. vitamin C daily for 10 days. In none of these was any improvement noted whereas all subsequently became normal with vitamin A. Five subjects with normal curves in the upper part of the normal variability curve also showed no improvement with this dose. In another subject with severe night-blindness the excretion of vitamin C was followed during dosing. He was found to be decidedly "unsaturated," requiring 8 days' dosing (total 4000 mg. vitamin C) before the urinary excretion rose significantly. At the end of this time the dark-adaptation curve had not altered. Further dosing for 14 days with 100 mg. daily was also without effect. The subject was then given a total of 900,000 I.U. of vitamin A over a period of 14 days, at the end of which his dark-adaptation curve was normal. Further investigation of the effect of vitamin C is needed.

DISCUSSION

It is not to be expected that vitamin A is the only factor affecting dark-adaptation. In a process so complicated, and involving not only the photochemical changes in the retina but the transmission of nerve impulses and the interpretation of these in the cortex, it is obvious that any link in the chain may be affected. Thus lack of oxygen and hypoglycæmia (McFarland and Forbes 1940) as well as benzedrine and alcohol all produce a change in dark-adaptation, the latter improvement, the former deterioration. As we have seen, benzedrine and alcohol produce their effect without any corresponding change in the vitamin A of the blood. The fact that,

TABLE II—EFFECT OF 20 C.CM. OF ALCOHOL ON DARK-ADAPTATION

Case	Final cone threshold (log μμl)			Rod-cone transition time (min.)			Final rod threshold (log μμl)		
	Before	After	Improvement	Before	After	Improvement	Before	After	Improvement
1	5·7	5·7	0	8	5	3	3·63	3·42	0·21
2	5·85	5·7	0·15	5½	5½	0	3·23	3·23	0
3	5·7	5·65	0·05	7½	5½	2	3·54	3·42	0·12
4	5·95	5·75	0·2	5½	4½	1½	3·54	3·23	0·31
5	5·7	5·7	0	7½	6½	1½	3·72	3·54	0·18
6	6·02	5·92	0·1	6½	6½	0	3·54	3·42	0·12
7	5·72	5·72	0	6½	6½	0	3·54	3·23	0·31
8	5·8	5·75	0·05	7½	6½	1½	3·72	3·54	0·18
9	5·65	5·50	0·15	7½	6	1½	3·42	3·32	0·1
10	5·7	5·7	0	7	5½	1½	3·54	3·42	0·12
11	5·7	5·7	0	5½	3½	2½	3·42	3·42	0
12	5·7	5·7	0	6	6	0	3·42	3·42	0
13	5·7	5·7	0	5½	5½	0	3·32	3·32	0
14a	5·55	5·55	0	8½	8½	0	3·54	3·54	0
14b	5·55	5·35	0·2	8½	7	1½	3·54	3·54	0

TABLE III—EFFECT OF 5 MG. BENZEDRINE ON DARK-ADAPTATION

1	5·6	5·45	0·15	7½	6	1½	3·42	3·10	0·32
2	5·85	5·75	0·1	8½	6	2½	3·42	3·23	0·19
3	5·7	5·65	0·05	7½	5	2½	3·54	3·32	0·22
4	5·9	5·8	0·1	5½	4½	1	3·54	3·32	0·22
5	5·7	5·7	0	8	5½	2½	3·63	3·42	0·21
6	6·0	5·8	0·2	6½	5½	1	3·54	3·32	0·22
7	5·7	5·7	0	6	3½	2½	3·42	3·42	0
8	5·8	5·7	0·1	7½	6½	1½	3·72	3·54	0·18
9	5·7	5·7	0	5½	5½	0	3·32	3·32	0

within the normal range, dark-adaptation and blood vitamin A may vary in opposite directions also shows that other factors must affect dark-adaptation. Moreover, congenital and hereditary night-blindness and certain diseases of the retina affect the dark-adaptation independently of vitamin A. The only proof that any subject has poor dark-adaptation because of deficiency in vitamin A is the improvement of the dark-adaptation curve with vitamin-A therapy. It is essential to use a stringent test such as that described if very deficient subjects are not to be missed, because of the transient effect of small doses on such subjects. In practice, by far the commonest cause of a high threshold is deficiency of vitamin A and surveys of threshold values in a population show, almost entirely, differences in the state of nutrition in respect of this vitamin.

Even when it is known, however, that vitamin A can cure a case it is not known what part of the cycle of vitamin-A metabolism is at fault. Any of the stages between the diet and the conversion to the retinal pigment may be affected and any of these conditions might be cured by large doses of vitamin A. Investigations into the different parts of this cycle are very sparse (see Patek and Haig 1939, Chevallier and Choron 1938, Thiele and Klodwig 1939, Lindquist 1938, May et al. 1940).

The relation between the blood vitamin A and the degree of night-blindness is also complicated. It is clear that since vitamin A can improve hemeralopia there must be some relationship between the vitamin A available to the retina and the curve of dark-adaptation. From the results described here it is certain that there is no standard level of blood vitamin A which could be used as a test for deficiency instead of the "threshold lability" test. On the other hand, in any individual there does appear to be a critical level of blood vitamin A below which the final rod threshold is abnormal. Below this level, the lower the blood vitamin A the higher the rod threshold. Raising the blood vitamin A above this level, however, does not improve the final rod threshold.

It is not known whether the level of blood vitamin A bears any relationship to the reserves of the body, as found in the liver, or why there should be different normal levels of blood vitamin A in different people.

The mechanism of the action of alcohol and benzedrine in dark-adaptation is obscure, nor is it necessarily the same in both. The effects are not related to the amount of subjective effect produced and in the case of benzedrine the general effects are maximal after the effect on dark-adaptation has worn off. They are also not associated with changes in the blood vitamin A; in fact, they may produce an improvement beyond that possible with vitamin A, and threshold values may be found considerably lower than those met with in even the best normal individuals. The use of these drugs, and especially of alcohol, for improving dark-adaptation must be considered in the light of their other, more obvious, effects.

SUMMARY

In a subject with night-blindness due to vitamin-A deficiency a single dose of the vitamin may produce no improvement, an improvement lasting a few hours, or one lasting several days or weeks.

A severely deficient subject given repeated doses of vitamin A will show no response or a transient response at first and a more prolonged effect after further dosing.

The dose of vitamin A required to produce prolonged improvement is usually between 300,000 and 2,000,000 I.U. This dose is not related to the initial degree of night-blindness.

In testing whether a case of night-blindness is due to deficiency of vitamin A possible transient responses must be borne in mind. It is necessary to ensure (*a*) that the dose is adequate and (*b*) that the test is performed at a time when improvement is likely.

There is no standard level of blood vitamin A which would indicate whether a subject is deficient in vitamin A or not.

In any single individual there is a critical level of blood vitamin A. Below this level, the lower the blood vitamin A the higher the final rod threshold.

Alcohol and benzedrine both produce transient improvement in dark-adaptation without any corresponding rise in blood vitamin A. The resulting improvement may be beyond that possible with vitamin A.

Vitamin C has not been found to improve any subject tested even if originally deficient in this vitamin.

I should like to thank Prof. C. R. Harington for his encouragement and for the laboratory and other facilities, and Dr. A. G. Spencer for his coöperation in some of the preliminary investigations.

I am indebted to British Drug Houses Limited for generous supplies of vitamin-A alcohol and esters.

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SIGNIFICANCE OF INTELLIGENCE IN SKIN CASES

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IN a previous paper (Hodgson 1941) I showed that subnormal intelligence was very common among Army patients suffering from scabies. During recent months the intelligence of 1002 patients attending a military dermatological clinic was tested by the R.E.C.I. matrices (Penrose and Raven 1936, Raven 1939), and allotted by a method previously described to one of the following grades: (*a*) very inferior intelligence; (*b*) below average intelligence; (*c*) average intelligence; (*d*) above average intelligence.

Every patient who attended the clinic during the period suffering from a disease shown in the first column of table I was tested in this way. This table also shows for each disease the number of patients examined and the results of the intelligence test.

For the purposes of comparison these diseases can be classified into three groups: skin diseases; infestations;

TABLE I—GROSS FIGURES FOR ALL DISEASES

—	Cases	Grade (*a*) Very inf.	(*b*) Below av.	(*c*) Av.	(*d*) Above av.
Skin diseases—					
Alopecia areata	27	3	8	13	3
Eczema	37	0	7	19	11
Impetigo	73	2	24	39	8
Pityriasis rosea	12	2	2	7	1
Psoriasis	48	4	9	25	10
Seborrhoeic dermatitis	66	3	19	38	6
Tinea (all cases)	33	2	12	15	4
Warts (excluding venereal)	10	0	3	6	1
Infestations—					
Scabies	407	72	155	153	27
Pediculosis pubis	90	18	32	36	4
Venereal diseases—					
Gonorrhœa	137	24	49	51	13
Syphilis	62	10	17	22	13

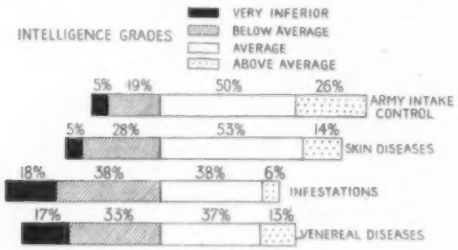
and venereal diseases. Statistical analysis, ætiology and clinical features all justify this grouping.

The percentage distributions of intelligence grades in the groups and in the control (500 consecutive recruits at a R.A.M.C. depot) are set out in table II and are compared diagrammatically in the figure.

TABLE II

—	Cases	Grade (per cent.)			
		(a)	(b)	(c)	(d)
Army intake control— ..	500	5	19	50	26
Skin diseases	306	5	28	53	14
Infestations	497	18	38	38	6
Venereal diseases ..	199	17	33	37	13

It will be seen that " very inferior " intelligence occurs more than three times as frequently in both the infestation and venereal groups as in the control group, while in the skin group it occurs with no greater frequency than in the control. Furthermore, all three groups of patients under consideration show a preponderance of subnormal intelligence, least decided in the skin group, and so great in the infestation group that actually as much as 56% fall into the subnormal intelligence grades. Mellanby's (1941) recent emphasis on the personal-contact factor in the spread of scabies lends particular interest to the close



Distribution of intelligence grades.

similarity in the intelligence distributions of the infestation and venereal groups, especially in view of their widely different pathogeneses.

An investigation of the intelligence distribution of the individual diseases which form the groups in this paper is in progress.

SUMMARY

The intelligence of patients attending a military dermatological clinic has been investigated. For the purpose of comparison cases were divided into 3 groups: venereal diseases, infestations and other skin diseases.

A high proportion of men with " very inferior " intelligence was found in the infestation and venereal-disease groups. All three groups showed a higher proportion of subnormal intelligence than the control and among infested patients the proportion of subnormal intelligence amounted to 56%.

I wish to thank Lieut.-Colonel P. J. Dwyer for giving facilities for this investigation and Prof. M. Greenwood for his statistical advice.

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OSLER MEMORIAL IN PHILADELPHIA.—The " Old Post House " at Philadelphia General Hospital has been opened as a memorial to Osler because it was here that he taught and practised pathology when professor of clinical medicine in the University of Pennsylvania. The house, which had been relegated to the position of the hospital paint shop, has been restored through the generosity of Messrs. John Wyeth and Brother, so that it resembles as nearly as possible what it was in Osler's time, and in it hangs the painting by Dean Cornwell, also the gift of Messrs. Wyeth, which shows Osler in characteristic attitude addressing a group of residents.

MACROCYTIC ANÆMIA IN PREGNANT WOMEN ON THE GOLD COAST*

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THIS paper is based on a study of 100 cases of macrocytic anæmia selected from the records of the Maternity Hospital, Accra, in the ten years (1928–38) after the hospital was opened; 38 of the cases were under my care. The cases constituted about 1% of the total in-patients, but since only severe and definite cases are included this figure does not represent the full incidence of the disease. I have included cases complicated by malaria and hookworm and some cases with concurrent urinary infection. In all these the anæmia was so profound that I had no hesitation in considering them to be primarily cases of macrocytic anæmia of pregnancy.

CLINICAL HISTORY

Detection of anæmia among the dark-skinned by inspection alone is difficult, and slight cases tend to escape notice. The prevalence of anæmia in 481 unselected cases attending the maternity hospitals in Accra and Kumasi is shown in the table. Macrocytic anæmia, in my 38 cases, appeared to develop rapidly; the duration of symptoms was seldom more than a fortnight. In one or two cases admitted to hospital on account of other conditions, severe macrocytic anæmia was observed to develop within a few days.

A primipara of 32 weeks maturity, complained of general pains and headache; the hæmoglobin on admission was 55%; six days later it had dropped to 38%, and the red-cell count was 1,360,000 per c.mm.

Age-incidence cannot be given, because the patients do not know their ages; 64 were primiparæ and 36 multiparæ; thus in the Gold Coast multiparity is not an important factor in ætiology. The stage at which the anæmia developed, in the 106 pregnancies of these 100 women, was as follows:

Maturity in weeks	Cases	Maturity in weeks	Cases
Under 20	3	31–35	26
20–25	18	36–40	13
26–30	40	Unknown	6

Thus 29 cases occurred in women of less than twenty-eight weeks' maturity, showing that the disease was not uncommon prior to the last trimester period.

Concurrent infections.—The history of yaws was positive in 18 and negative in 79 cases; 3 were unrecorded; but since the history depended entirely on the statements of the patients these figures are not necessarily—or even probably—correct. The Wassermann reaction was investigated in 53 and was found to be strongly positive in 11, and positive or faintly positive in 7. This does not differ significantly from the positive-Wassermann rate of the population as a whole, which is about 32% (Medical Research Institute, Accra).

Malarial parasites were present in 29 cases. The incidence of hookworm and urinary infections is noted later.

These observations may be compared with the figures obtained in the routine laboratory examination of in-patients in the Accra maternity hospital shown below:

Malaria

Blood examinations: 6925.
Malarial parasites present in 27%.

Wassermann Reaction

Examinations: 5335. Positive Wassermann rate 32·5%.

Fæces

Examinations: 1372. Ascaris ova present in 17%.
Ankylostome ova present in 16%.
Tænia ova present in 1 case.

SIGNS AND SYMPTOMS

When the patient is first seen, anæmia is usually well advanced and she is complaining of one or more of the

* Abstract of a thesis presented for degree of M.D. University of Edinburgh, October, 1939.

symptoms of anæmia: breathlessness, palpitation, weakness or giddiness. Other common complaints are of swelling of the feet and cough. Sometimes there is no complaint of ill health, and at other times the complaint may be of fever, dysentery or the passage of scanty urine. The patients are usually well nourished. The severe anæmia is characteristically associated with a slight blurring of the features, due to œdema of the face. Frank œdema of the feet is common, and this may extend up the abdominal wall. There may be a faintly icteric tinge of the conjunctiva, but this is usually associated with concurrent malaria. The tongue may be sore, or moist and white and indented by the teeth. Sore mouth is not more common in these cases of macrocytic anæmia than it is in the pregnant population as a whole. The temperature is usually raised; pyrexia was present in 82 of the cases considered here.

There is considerable breathlessness on exertion, a rapid pulse and soft blowing systolic murmurs over the præcordia. Œdema was noted in 38 of the 100 cases. The respiration-rate is raised in severe cases, and a constant, loose, exhausting cough may be present, accompanied by moist râles in the chest; cough was present in 24 cases of the series. Enteritis may be severe and misleading, but clears up as the general condition improves. The liver and spleen may be enlarged; splenic enlargement was recorded in 11 cases. No sign of involvement of the nervous system was observed.

Fæces and urine.—The fæces were examined in 85 cases. Ascaris ova were found in 17, hookworm ova in 16, *Entamœba histolytica* in 2, trichuris ova in 2 and strongyloides larvæ in 2; *E. coli* was present in 7 cases and flagellates in 15. Flagellates are as a rule seen in patients who are debilitated, but there seems little reason to consider them as the cause of the enteritis which is so often present in macrocytic anæmia. Albumin, pus organisms and even casts may be present in the urine. Infection may have some rôle in causation, but the urine clears as the general health improves. Albuminuria was present in 54 cases in the series, and micro-organisms were found in 9 of the 25 cases in which the urine was examined bacteriologically. Schistosome ova were present in 2 cases.

Blood picture.—There is a considerable reduction in the number of red cells. When the case is first seen the count is commonly about a million per c.mm. In several cases the count was below this figure; first blood-counts done in 106 pregnancies in the 100 women in the series gave the following results:

Red cells (millions)	Cases	Red cells (millions)	Cases
0·4–0·7	2	1·5–2	28
0·7–0·9	12	2–2·35	12
0·9–1·2	27	No record	3
1·2–1·5	22		

In many of these the patient recovered. The colour index was over 1 in 78 cases and between 1 and 0·8 in 28. Blood films were examined on 294 occasions: red cells with a diameter of over 7·5 μ were observed in 78 (26%); polychromasia in 10 (1%); cells deficient in hæmoglobin in 79 (27%); poikilocytosis in 1 (0·3%); anisocytosis was usual and in most cases macrocytes were present; normoblasts and megaloblasts can usually be found and may be numerous. In one case there were 9000 white cells per c.mm., with Hb 22%, 900,000 red cells per c.mm. and 7 normoblasts and 7 megaloblasts per 100 white cells. The film in macrocytic anæmia differs from that of true pernicious anæmia in the rareness of poikilocytosis. Sickling of the red cells was found in 2 of 9 cases examined for this condition. Since the rate for pregnant women as a whole is 13% (Medical Research Institute, Accra), this result appears to correspond with the average. The leucocytes are seldom increased, and the differential count showed no significant variation from the normal. The inversion in the proportion of polymorphs and lymphocytes mentioned in the literature was observed only in one fatal case. Primitive white cells were occasionally observed.

The van den Bergh reaction was carried out in only 3 cases. The direct reaction was negative in all 3 and the indirect positive, which conforms with the general findings in this disease.

COURSE

Without treatment the condition progresses rapidly—in a few days the patient may become comatose and die. On the other hand, many cases tend to be cut short by the onset of premature labour. The woman may die during labour or in the first day or two of the puerperium, but if she survives this period recovery often sets in and may be as rapid as the progress of the illness in the first place. In most cases labour is premature, rapid and singularly bloodless. The uterine muscle does not seem to be weakened, and provided the cardiac muscle does not fail birth is swift. The infant-mortality and stillbirth rates are high. The puerperium tends to be febrile and sepsis added to the anæmia seriously affects the chances of survival.

The history of cases treated in hospital contrasts with that of untreated cases. The patient was considered to be in a critical condition if the hæmoglobin was below 20%, but even then response to treatment was usually rapid and gratifying. Twenty-four hours after admission the patient may look, if anything, more bloodless than when first seen; after forty-eight hours of liver treatment, however, one can say definitely that improvement has begun, even without blood-examination. Faint flushing of the conjunctivæ is a sign which makes the clinician feel satisfied about the patient for the time being. Every day thereafter improvement is apparent; blood-examination a week after admission shows a gain of at least half a million in red cells, and of 5–10% in hæmoglobin. The next week should show the same advance, especially if iron has been added to the liver treatment. At the end of a week the œdema and cough should have almost disappeared. The temperature settles down in ten days or so, and intercurrent gastro-intestinal and urinary complications usually recover as the anæmia improves. At the end of the first week the patient feels much better, and in two weeks she becomes restive. Probably she may be prevailed on to stay another week in hospital; a few very severe cases have remained even longer. By the end of three weeks improvement is so pronounced that the patient is allowed to go, usually with instructions to continue to take liver. This advice is rarely followed, but in those cases where a follow-up was possible it was found that the anæmia did not return in that pregnancy. Once response to treatment is definitely established labour rarely gives rise to anxiety.

Of this series, 53 patients were delivered in hospital; the puerperal morbidity-rate among them was 34%, the prematurity-rate 64%, and the stillbirths and deaths of infants within the first week of life, together, 40%.

A follow-up of the cases after discharge from hospital has been carried out as far as possible, but the difficulties are peculiar: the people are illiterate and may be unable to give their correct names or addresses. As far as can be judged these women recover their normal health some time after discharge from hospital, and relapse has not been observed during the same pregnancy. Recurrence of anæmia is common, however, in subsequent pregnancies; 10 of the 100 patients were traced through subsequent pregnancies, and in 8 of them severe macrocytic anæmia developed in the next pregnancy; in 1 case, though the second pregnancy was apparently normal, severe anæmia developed in the third.

PROGNOSIS AND MORTALITY-RATE

If the patient is untreated, the outlook is bad unless labour is early. The prognosis is good under treatment, provided the patient is not in extremis when first seen and if she is not already in labour. If the hæmoglobin is not less than 20% and the red cells not below 1,000,000 recovery is the rule. One or two patients under my care had a much lower hæmoglobin value and recovered, but such cases cause anxiety for some time, and must be considered as critical, especially if they go into labour. The prognosis has greatly improved since liver extract suitable for parenteral administration has been available, but, as might be expected, the patients are so ill that their ability to take, retain and absorb liver by mouth is uncertain and variable.

Acute anæmia appearing for the first time in the puerperium may cause anxiety. Œdema is not severe and the question of sepsis has to be considered. Even a low-grade infection makes the response to treatment less

satisfactory, and some of these cases tend to become aplastic in type.

There were only 5 deaths among the 100 cases treated in hospital. This figure is low considering that the anæmia was often severe.

TREATMENT

Treatment was by rest in bed, full diet and raw liver or liver extract by mouth or by injection. If the patient could take it, ½ lb. of raw liver was given daily, finely minced, with salt and pepper, and eaten with orange juice. The patients preferred it to Marmite, and there was some evidence that liver was more quickly beneficial. In India marmite is the sheet anchor of therapy. It was used also in this series, but only in small doses, which probably had little effect. Campolon injections were used in all severe case from the middle of 1935. The dose at first was 2 c.cm. injected into the buttock every second day for 5–7 injections. Later it was found that this was often inadequate, and that 4 c.cm. daily was needed to get a satisfactory result. As the macrocytic anæmia responds to treatment, the underlying and concurrent hypochromic anæmia is unmasked, and a useful response to iron takes place. Iron therapy was usually started as soon as the initial response to liver therapy was well established—that is, in five to seven days. Iron was given as one of the scale preparations in doses of gr. 30 thrice daily, or in conjunction with arsenic.

Blood-transfusion has seldom been necessary. According to Balfour (1927), when response is unsatisfactory a small transfusion, intravenously or intramuscularly, will give the necessary stimulus towards recovery. In the case of a strongly positive Wassermann reaction, it is as well to give a course of neoarsphenamine.

Induction of labour is seldom required. In a few cases, which respond well at first and then remain stationary with hæmoglobin and red cells still at very low figures, it may be desirable to induce labour in the interest of the mother, but the measure is not devoid of risk because of the danger of sepsis developing in the puerperium.

In cases discharged from hospital before delivery it has been impossible to insist on continuance of treatment or even to keep track of the patients. Those who could be followed up seem to have gone through labour safely even without further treatment. The danger of the recurrence of anæmia in future pregnancies can probably be reduced by antenatal supervision and by early treatment of cases showing a low hæmoglobin level.

ÆTIOLOGY

According to recent literature macrocytic anæmia is regarded as a deficiency disease due to lack of the hæmopoietic factor necessary to normal blood-formation. This lack may be due to several factors of which the three most important are :

1. Temporary lack of intrinsic factor in the gastric secretion or to temporary failure of power of assimilation (Strauss and Castle 1932, 1933, Vaughan 1938).
2. Lack of extrinsic factor or of vitamin B_2 in the diet.
3. A predisposing iron-deficiency anæmia, believed by some writers to be always present before macrocytic anæmia can develop, and due mainly to unsatisfactory diet (Larrabee 1925, Strauss and Castle 1935).

I believe that all of these factors may have some bearing on the prevalence of this form of anæmia in the Gold Coast. The sick in the tropics are often afflicted with two, three or four different pathological conditions, and since in any form of ill health the gastric secretion is seriously concerned, it is not unreasonable to presume lack of power of assimilation and perhaps temporary lack of intrinsic factor. The diet of the people on the Gold Coast is demonstrably poor in vitamin B_2 or extrinsic factor, so that even in health there may be little margin. Wills (1939) holds that all cases of anæmia in pregnant women associated with less than 90% of hæmoglobin should be treated. If this is taken as the standard, the amount and degree of anæmia on the Gold Coast as shown in the table is grave indeed.

Another factor may be the presence of liver disease and its influence on the ability of the body to store or to utilise hæmopoietic substance. Goldhamer, Isaacs and Sturges (1934) demonstrated that the normal liver stores hæmopoietic substance, but that if diseased it fails to do so or is unable to release it. Clark (1936) reported that disease of the liver appears to be more frequent in Nigeria, where dietetic conditions are similar to those on the Gold Coast, than it is at home. He held, as a result of rat experiment, that this is largely due to the poor class of carbohydrates, especially cassava and cocoa-yam, which are largely consumed. He considered these roots to be dangerous cyanogenic substances in the absence of a sufficient supply of good-class protein ; in some circumstances maize may act in the same way. Fairley and his colleagues (1938) found that malaria caused liver damage in Macedonia, and malaria is prevalent on the Gold Coast.

BLOOD FINDINGS IN TWO GROUPS OF 481 UNSELECTED PREGNANT WOMEN WITH NO DEFINITE SYMPTOMS OF ANÆMIA.

Group I: 100 women attending hospital at Kumasi.
Group II: 381 women attending hospital at Accra.

Red cells (millions)	Cases (group I*)	Hb (Sahli) %	Cases (group I)	Cases (group II†)
Over 5	3	Over 80	5	14 (4%)
4–5	37	70–80	33	77 (20%)
3–4	53	60–70	53	172 (45%)
2–3	7	50–60	8	108 (28%)
		Under 50	1	10 (3%)

* Colour-index unity or over in 23 ; malarial parasites present in 23. † Malarial parasites present in 94.

Factors predisposing to macrocytic anæmia thus appear to be various, but the most important are, I believe, the three first mentioned.

To what extent tropical macrocytic anæmia of pregnancy and macrocytic nutritional anæmia in the non-pregnant are the same disease has not been finally agreed. Balfour (1927) reported cases which appeared to be identical except that pregnancy did not coexist. Fairley and his colleagues (1938) suggested that " nutritional " rather than " tropical " macrocytic anæmia was a more suitable term when reporting cases occurring in Macedonia. Davidson and Fullerton (1939) refer to nutritional macrocytic anæmia and to macrocytic anæmia of pregnancy under different headings.

My own experience of macrocytic anæmia among non-pregnant women in the Gold Coast is too limited to be of value, but in the cases occurring in pregnancy the problem appears to be essentially one of nutritional defect. From observation of the disease and of the prompt relief which follows the administration of liver or liver extract, I consider that macrocytic anæmia is not a disease of pregnancy but a disease associated with pregnancy. Pregnancy is the most common and prolonged strain to which young women are subjected ; add to this an unsatisfactory diet with the disorder of gastric secretion which is common in pregnancy and the stage is set for breakdown in the blood-forming system. In the absence of pregnancy the breakdown would probably not occur, or at least not occur until a more advanced age.

SUMMARY

Severe macrocytic anæmia is not uncommon among pregnant women on the Gold Coast ; 100 severe cases are analysed.

In both treated and untreated cases there is a tendency to premature labour with stillbirth or death of the infant in the first week of life. When untreated the maternal mortality is high, but if the anæmia is not too far advanced recovery may be rapid after delivery. If anæmia is severe, death rapidly supervenes.

Macrocytic anæmia of pregnancy quickly responds to treatment with liver or liver extract, preferably administered by injection. The fatality in the present series was only 5%. Severe anæmia often recurs in subsequent pregnancies.

The more important predisposing factors are unsatisfactory diet, intercurrent disease, especially malaria, and hypochromic anæmia.

Many Gold Coast women are anæmic during pregnancy. Prevention of this depends largely on improvement in the general standard of living. In the meantime the obstetrician must be on the alert to detect and treat all

Continued at foot of opposite page

SERUM CALCIUM AND INORGANIC PHOSPHORUS IN PARATHYROID TETANY

THEIR BEARING ON TREATMENT

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AMONG the measures recommended in the treatment of parathyroid tetany by raising the serum calcium are the administration of parathyroid hormone, thyroid, calcium salts, vitamin D, dihydrotachysterol (A.T. 10), lactose, the production of an acidosis, and diets with a high calcium to phosphorus ratio.

Parathyroid hormone.—It is now clear that the chief function of the parathyroids is the mobilisation of calcium from the bones into the blood-stream. Removal of the parathyroids causes calcium to leave the blood, probably to be precipitated in the bones, for as was first shown by Greenwald and Gross (1925) the sudden fall in the serum calcium in tetany is accompanied by a lowering in the calcium excretion. The abstraction of the active principle of the parathyroid glands by Hanson (1923) and Collip (1925) led at once to its employment in the treatment of hypoparathyroidism. Albright and others (1929) showed that injection of parathyroid hormone in tetany brought about an abrupt increase in the urinary excretion of phosphorus followed by a fall in the blood phosphorus (unless the serum calcium rose above 15 mg. per 100 c.cm. when the urinary excretion of phosphorus fell and blood phosphorus rose); and a gradual increase in the urinary excretion of calcium with a gradual but large rise in serum calcium. Several workers have been warned against the employment of parathyroid hormone as a routine measure in the treatment of tetany on the grounds of the danger of overdosage, of loss of effectiveness or of decalcification of the bones if used over long periods, as well as expense.

Thyroid.—Kunde, Oslund, Kern (1928, 1931) found that the tetany of thyroparathyroidectomised dogs could be temporarily controlled by thyroid feeding. After this, Aub and others (1932) stated that the administration of thyroid or thyroxin to cases of hypoparathyroidism resulted in a well-marked elevation of the serum calcium, and their findings have been accepted by Hunter (1930), Shelling (1935) and Means (1937).

Calcium salts.—The administration of calcium salts intravenously, intramuscularly or by mouth still remains the chief therapeutic measure in parathyroid tetany. When a prompt response is desired calcium is given intravenously as the chloride or gluconate in 10% solutions in doses of 10 c.cm. Salvesen, Hastings, and McIntosh (1924), Smith and Sternberger (1932), and Shelling (1935) have found that the maximum concentration of serum calcium (as much as 100% increase) is reached at the end of the injection; thereafter there is a rapid fall to the previous level in 2–4 hours. Calcium gluconate alone can be injected intramuscularly without causing severe inflammatory reactions. There is a choice of many salts to be given by mouth, but the chloride, lactate and carbonate are most commonly employed, the first because of its solubility and acidotic qualities which promote absorption, the second because of its palatability and the last because of its high calcium content.

Vitamin D and dihydrotachysterol (*A.T.* 10).—Since Holtz (1933) introduced dihydrotachysterol—or A.T. 10 (antitetanic preparation 10) as it is sometimes called—into the therapy of tetany a vast literature has accumulated on its value. According to McLean (1941) the effects of vitamin D and A.T. 10 are similar if given in comparable doses, and there is no reason "to attribute a higher degree of specificity or a lesser likelihood of toxicity to dihydrotachysterol than to vitamin D." One milligramme of calciferol is equivalent to 40,000 international units of vitamin D, and this is equal to 0·1 c.cm. of A.T. 10. Much confusion has arisen over the value of vitamin D in the treatment of parathyroid tetany. There are two well-defined dosage ranges; the first is antirachitic (700–1000 I.U. per day), and the second is the dosage necessary to raise a subnormal serum calcium (50,000–200,000 I.U. per day). According to McLean the higher dosage of vitamin D leads to an increase in the excretion of urinary phosphorus, a fall in serum phosphate, and a rise in the serum calcium, while both calcium and phosphorus are added to the blood by liberation of these minerals from the bones. Hess, Benjamin and Gross (1931), Jones and Rapoport (1931), and Shelling (1931) have shown that the calcæmic effect of vitamin D in large doses can be produced without calcium feeding. Vitamin D in large doses has therefore two distinct actions—it promotes absorption of calcium from the gut and it mobilises calcium and phosphorus from the bones.

Lactose.—Dragstedt and Peacock (1923) and Inouye (1924) stated that lactose-containing diets protected parathyroidectomised animals against tetany. Greenwald and Gross (1929) found this only to be true if large amounts of calcium are also contained in the diets. Thus lactose acts only by making the calcium more available.

Production of an acidosis.—Wilson, Stearns and Janney (1915), using hydrochloric acid, and Boyd, Austin and Ducey (1926), and Greenwald (1929), using ammonium chloride, studied the effect of acidosis on parathyroid tetany. The severity and frequency of the attacks were reduced and this was accompanied by an increased excretion of phosphorus. The effect on the serum calcium was variable. Anderson and Lyall (1939) found that hydrochloric acid raised the serum calcium of parathyroid tetany above normal.

Low phosphorus therapy.—The beneficial effects of a low phosphorus, high calcium diet have been substantiated by Shelling and Goodman (1934), Ellsworth (1933), and Anderson and Lyall (1939), who found that low calcium or high phosphorus diets were conducive to tetany, whereas high calcium or low phosphorus diets were ameliorative. It would appear that the desirable intake of phosphorus daily is not greater than 0·5 g., and with this amount of phosphorus 2 g. of calcium daily should be taken. In discussing the nature of a low phosphorus diet, Shelling has stated it means eating less meat, glands, nuts, milk, cheese and yolk of eggs, and more fruit, vegetables, white of eggs, carbohydrate and fat. Milk and cheese, which are the chief sources of calcium, also have a high phosphorus content.

PRESENT INQUIRY

In the present inquiry, a series of cases of postoperative parathyroid tetany (complicating subtotal thyroidectomy for relief of thyrotoxicosis) were investigated and the effect of thyroid, calcium salts, ammonium chloride and vitamin D (calciferol) on the blood chemistry determined. By this study it was hoped to rationalise the treatment of tetany when it occurs as a complication of subtotal thyroidectomy for the relief of thyrotoxicosis. In a previous paper (Robertson 1941c) attention has been drawn to transient mild postoperative attacks of tetany due to trauma or infection. In such cases there is a fall in serum calcium which invariably rises within a few days or weeks to normal without any calcium or other medication. The cases of parathyroid tetany in the present inquiry were all chronic ones, ranging from 3½ to 11 years in duration. Fluctuations due to changes in the activity of the parathyroids or accessory parathyroid tissue could therefore be reasonably excluded.

The chemical methods employed have already been described (Robertson 1941a), except for the measurement of the alkali reserve (Van Slyke 1917). In table I are given details of the seven cases investigated. Of these, two (cases 1 and 7) were unable to continue the investigations after thyroid feeding owing to evacuation problems. No form of therapy had been received by any patient for at least 1½ years. The calcium and phosphorus intakes were calculated from an average of 7–10 daily dietary surveys. The gastric analyses were normal, and all cases secreted free hydrochloric acid after gruel.

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patients with low hæmoglobin values, in the expectation that by so doing severe anæmia may be successfully prevented.

I thank the Director of Medical Services of the Gold Coast for permission to publish this paper.

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TABLE I—SUMMARY OF CASES OF PARATHYROID TETANY INVESTIGATED

Case.	Age	Since attack of tetany	Since any calcium medication	Daily intake		Maximum secretion of free HCl *	Milk daily
				Calcium	Phosphorus		
	Years			g.		(c.cm. n/10 NaOH	oz.
1	25	3½	1½	0·96	1·08	27	16
2	51	5½	5½	0·36	0·92	45	5
3	38	4	3	0·5	0·8	30	7
4	17	3½	2	1·2	1·3	24	24
5	31	11	6	1·16	1·36	18	30
6	30	3½	2	1	1·1	16	22
7	14	5½	2	0·84	1·02	16	12

* By fractional test-meal using gruel (Beaumont, G. E. and Dodds, E. C. Recent Advances in Medicine, London, 1941.)

Thyroid feeding.—The results are given in table II. In every instance except one, thyroid administration was followed by a fall in serum calcium. The two mean values, 8·51 mg. per 100 c.cm. before and 8·01 mg. after thyroid, were found to have a highly significant difference ($t = 4·1$, $P = 0·001$), in spite of the small number of cases. The value of t was calculated from the individual pair differences.

Employing the same statistical methods no significant difference was found in serum inorganic phosphorus before and after thyroid feeding ($t = 0·6$ and $P = 0·5$).

In every instance thyroid administration was accompanied by a rise in the serum phosphatase, the mean value rising from 4·77 units to 6·16. This difference was found to be highly significant ($t = 4·1$, $P = ·001$). If the serum phosphatases of parathyroid tetany are compared with the normals previously published by Robertson (1941a) the two mean values of 4·77 units and 7·795 units are found to have a highly significant difference ($t = 3·16$, $P < 0·01$). The two mean values of 6·16 units for parathyroid tetany after thyroid feeding and 7·795 units for normals show no significant difference ($t = 1·26$, $P = 0·2$). These investigations indicate that thyroid administration lowers the serum calcium of parathyroid tetany, findings opposed to current belief. The serum phosphatase is diminished in parathyroid tetany and thyroid feeding raises it to normal.

Calcium salts.—In table III are the findings after the daily ingestion of the equivalent of 3 g. of calcium for two weeks. The analyses were carried out in the postabsorptive state, and the phosphate, lactate or chloride were employed. No significant difference could be detected in the level of the postabsorptive serum calcium before and after the daily administration for two weeks of these calcium salts in equivalent doses. For phosphate ($t = 0·92$, $P = 0·4$), for lactate ($t = 1·28$, $P = 0·3$) and for chloride ($t = 2·11$, $P > 0·05$), the values of t being calculated from the individual pair differences. No significant alteration in the serum phosphorus was found to take place after these various calcium administrations.

It is well established now (Bauer and Ropes 1926, Greenberg and Gunther 1932, Freeman, Kant and Ivy 1935) that in normal people the serum-calcium response to ingested calcium reaches its maximum at the end of two hours. Preliminary observations showed that cases of parathyroid tetany responded in a similar manner, the maximum concentration of serum calcium being reached at the second hour. In table IV are given the variations in the serum calcium and inorganic phosphorus before and two hours after the ingestion of various soluble and insoluble calcium salts. The absorption of an insoluble calcium salt will depend on its solution by the free hydrochloric acid of the stomach. All the cases investigated had a normal secretion of free hydrochloric acid. Examination of the results statistically, the value of t being calculated from the individual pair differences, show that there is no significant difference in the serum calcium before and after calcium phosphate ($t = 1·54$ and $P = 0·1$), but that the ingestion of calcium lactate and carbonate produced an elevation of the serum calcium which was highly significant (for lactate $t = 5·27$ and $P \ll 0·001$, and for carbonate $t = 4·93$ and $P \ll 0·001$). The serum inorganic phosphorus was not affected by the ingestion of any of the calcium salts. It seems, therefore, that the efficacy of a calcium salt in raising the serum calcium does not depend on its solubility (assuming a normal gastric secretion of free hydrochloric acid) but on its acid radicle.

TABLE II—EFFECT OF THYROID FEEDING ON SERUM CALCIUM, INORGANIC PHOSPHORUS AND PHOSPHATASE

Case	Before thyroid				After thyroid			
	Calcium	Inorganic phosphorus	Phosphatase *	B.M.R. †	Calcium	Inorganic phosphorus	Phosphatase *	B.M.R. †
	(mg. per 100 c.cm.)				(mg. per 100 c.cm.)			
1	8·2	3·6	5·4	− 16	7·2	3·8	7·7	+ 2
2	9	4·0	5·5	+ 6	9·0	4·3	6·4	+ 16
3	9·9	4·3	4	− 22	9·5	4·1	5·1	+ 11
4	8·2	5·7	5·2	− 5	7·9	5·4	8	+ 21
5	6·2	5·5	5·2	− 10	5·6	5·7	6·3	+ 9
6	9·1	4·2	4·3	+ 2	8·4	3·9	4·4	+ 23
7	9	4·5	3·8	− 31	8·5	4·1	5·2	− 7
Mean	8·51	4·54	4·77	− 11	8·01	4·47	6·16	+ 10

* Units of King and Armstrong. † Standard of Aub and Dubois.

Ammonium chloride.—The results are given in table V. Three grammes of ammonium chloride were given daily, and if it is assumed that complete conversion into urea and hydrochloric acid occurred this would be equivalent to 2·05 g. of hydrochloric acid or 560 c.cm. of a N/10 solution. There were no significant alterations in the serum calcium ($t = 1·005$; $P > 0·3$) and serum inorganic phosphorus ($t = 0·73$; $P = 0·5$) as a result of ammonium-chloride feeding in doses of 3 g. daily, despite significant changes in the alkali reserve ($t = 2·44$; $P < 0·05$).

TABLE III—SERUM CALCIUM AND INORGANIC PHOSPHORUS IN THE POSTABSORPTIVE STATE, AFTER INGESTION OF VARIOUS CALCIUM SALTS IN DOSES EQUIVALENT TO 3 G. OF CALCIUM (7·5 G. PHOSPHATE, 8·25 G. CHLORIDE OR 22·5 G. LACTATE) DAILY FOR TWO WEEKS

Case	Wt. (kg.)	Daily dosage Calcium (mg./kg.)	Serum calcium						Serum phosphorus					
			Phosphate		Lactate		Chloride		Phosphate		Lactate		Chloride	
			B	A	B	A	B	A	B	A	B	A	B	A
			(mg. per 100 c.cm.)											
2	46	65·2	9		8·7	9·6	9	8·8	9·7	3·9	4	4·5	4·3	3·7	4·2
3	48	62·5	9·5		9·3	9·3	8·7	9	9	4·4	3·7	4	4·4	4	4·3
4	54	55·6	8·2		7·9	8·3	7·1	7·9	8·3	5·7	6·4	6	5·9	6	5·6
5	48	62·5	6·2		6·8	7·8	8·3	7	8	5·5	4·9	5	5·2	4·5	4·6
6	47	63·8	9·6		8·9	9	9	9	9	4·2	3·8	4	3·6	4	4
Mean	..		8·50	8·32	8·8		8·42	8·34	8·8	4·74	4·56	4·7	4·68	4·44	4·54

TABLE IV—SERUM CALCIUM AND INORGANIC PHOSPHORUS 2 HOURS AFTER INGESTION OF SOLUBLE AND INSOLUBLE CALCIUM SALTS IN DOSES EQUIVALENT TO 2 G. OF CALCIUM (5 G. PHOSPHATE, 15 G. LACTATE OR 5 G. CARBONATES).

Case	Dosage of calcium (mg./kg.)	Calcium phosphate				Calcium lactate				Calcium carbonate			
		Serum calcium		Serum phosphorus		Serum calcium		Serum phosphorus		Serum calcium		Serum phosphorus	
		B	A	B	A	B	A	B	A	B	A	B	A
		(mg. per 100 c.cm.)											
2	43·5	9	9·2	4·3	4·3	9·6	10·7	4·5	4·8	9·3	9·8	4·2	4·1
3	41·7	8·7	8·9	4·4	4·3	9·3	10·2	4	4·3	9·1	9·4	4·2	4·2
4	37	8	8·7	5·9	6·7	8·3	10·1	6	6	8·9	9·8	5·2	5·5
5	42	8·3	8	5·2	5·2	7·8	8·8	5	5·1	8·4	9·1	4·8	4·4
6	43	9	9·6	4	4·3	8·9	9·5	3·9	3·9	9·6	10	4	3·6
Mean	..	8·6	8·88	4·76	4·96	8·78	9·86	4·68	4·82	9·06	9·62	4·48	4·36

B = before. A = after.

Vitamin D (calciferol).—The results are given in table V. In every instance calciferol administration was followed by a rise in the serum calcium. The elevation of the serum calcium was highly significant ($t = 12{\cdot}7$ and $P \lll 0{\cdot}001$) and was present in the postabsorptive phase. This rise in the serum calcium occurred in the absence of any orally ingested calcium other than that provided in the diet. No significant changes occurred in the serum inorganic phosphorus ($t = 0{\cdot}8$; $P = 0{\cdot}4$).

TABLE V—POSTABSORPTIVE STUDY—SERUM CALCIUM, INORGANIC PHOSPHORUS AND ALKALI RESERVE AFTER INGESTION OF 3 G. OF AMMONIUM CHLORIDE DAILY FOR TWO WEEKS. LEVELS OF CALCIUM AND INORGANIC PHOSPHORUS AFTER THE DAILY INGESTION OF 2·5 MG. OF CALCIFEROL (100,000 I.U. VITAMIN D) FOR TWO WEEKS WITHOUT CALCIUM ADDITIONAL TO DIET.

Case	After ammonium chloride						After calciferol			
	Serum calcium		Serum phosphorus		Alkali reserve		Serum calcium		Serum phosphorus	
	B	A	B	A	B	A	B	A	B	A
	mg. per 100 c.cm.				c.cm. CO_2%		mg. per 100 c.cm.			
2	8·3	8·3	3·3	3·9	67	63	8·3	9·7	3·9	4·3
3	9·3	9·3	4·1	4·4	68	64	9·3	10·1	4·4	4·2
4	7·1	7·8	5·9	5·6	61	61	7·8	8·9	5·6	5·2
5	8·8	6·3	4·6	5·6	68	62	6·3	8·4	5·6	4·8
6	9	9·2	3·6	3·8	56	56	9·2	9·6	3·8	4
Mean	8·55	8·18	4·5	4·66	64	61	8·18	9·34	4·66	4·5

every instance there was a rise in the serum calcium above the level during tetany. The mean values of 6·8 mg. per 100 c.cm. and 8·9 mg. were found to have a highly significant difference ($t = 5{\cdot}95$; $P \ll 0{\cdot}001$). It seems that following tetany there is regeneration of or accessory parathyroid tissue. It must be pointed out, however, that despite the presence of this accessory parathyroid tissue the serum calcium still falls far short of normal. There is a very significant difference between the serum-calcium levels of the so-called chronic tetany, with a mean of 8·9 mg. per 100 c.cm., and of the normals published previously (Robertson 1941a) with a mean of 10·39 mg. ($t = 3{\cdot}32$; $P < 0{\cdot}01$).

REGENERATION OF PARATHYROID TISSUE

In a previous paper, Robertson (1941b) attention was drawn to mild forms of parathyroid disturbance, where in the absence of the clinical manifestations of tetany the serum calcium fell. Without any form of calcium therapy, within a few weeks the serum calcium rose. Likely causes of this fall in the serum calcium were said to be trauma to the parathyroid glands through manipulation during the operation and disturbance of their blood-supply through œdema, blood-clot or infection. When destruction of the parathyroid glands is present and tetany appears, steps must be taken to increase the serum calcium. Many workers have raised the question of the presence of accessory and regenerative parathyroid tissue in the body which might function during tetany. When therapy designed to raise the serum calcium is being given, it is not easy to determine with certainty the part, if any, played by regenerative or accessory parathyroid tissue. In table III of this paper it was shown that, in the postabsorptive state, calcium given by mouth did not elevate the serum calcium. It follows therefore that, if any elevation of serum calcium occurs in the postabsorptive state, either regeneration of or accessory parathyroid tissue is present.

In table VI, observations on twelve cases of parathyroid tetany are set out. Two cases had no treatment, nine were given calcium lactate by mouth, and one was given a single injection of calcium intravenously. In the postabsorptive state none of these forms of calcium therapy could explain an elevated serum calcium. In

TABLE VI—SPONTANEOUS REGENERATION OF PARATHYROID TISSUE. SERUM-CALCIUM ANALYSES IN POSTABSORPTIVE STATE.

Case	Serum calcium during tetany	Follow-up observations		Treatment, if any
		Since attack of tetany	Serum calcium	
	mg. per 100 c.cm.	months	mg. per 100 c.cm.	
1	7·8	6	9	Oral calcium lactate
6	8·4	40	9·1	
2	7·5	62	9	1 injection of 10 c.cm. Calcium Sandoz intravenously.
8	5·8	30	9	Oral calcium lactate
3	8·6	2	10·4	
9	7·7	1	9·6	None
4	6·3	7	7·5	
10	7·5	1	8	
7	5·9	12	9	Oral calcium lactate
5	3·4	9	8	
11	4·5	22	7·7	
12	8·7	3	10·2	None
Mean	6·8	..	8·9	—

DISCUSSION

Thyrotoxicosis is associated with an excessive calcium excretion, which may lead to an osteoporosis, and a normal calcium absorption. The calcium excretion falls to normal with the cure of the thyrotoxicosis. In parathyroid tetany a diminished secretion of parathyroid hormone causes the serum calcium to fall and this is associated with a diminished calcium excretion and a normal absorption. Treatment of parathyroid tetany aims at raising the low serum calcium and this should be achieved by some mechanism similar in nature to that of parathyroid hormone which controls the release of calcium from the skeleton to the blood-stream. The raising of the serum calcium in tetany by large doses of calcium salts appears to be wrong in principle.

When however parathyroid tetany complicates subtotal thyroidectomy for the relief of thyrotoxicosis the treatment should take into account two factors. First, a demineralised skeleton in need of calcium, and a serum calcium requiring elevation. Large doses of calcium meets the first demand, but the second is not so simple. The disadvantages of injections of parathyroid hormone have already been referred to; thyroid feeding has been shown to lower still further the diminished serum calcium; the action of calcium salts is only transitory; therapeutic doses of ammonium chloride while producing a mild acidosis were found not to raise the serum calcium. The administration of a low phosphorus diet has been clearly shown by Shelling and Goodman (1934) and Anderson and Lyall (1939), among others, to be very efficacious in raising the diminished serum calcium of tetany. But food restrictions in war-time make it very difficult if not impossible to procure a low phosphorus diet, including as it does fruit, vegetables, white of eggs, carbohydrates and fats. Further, a low phosphorus diet is combined with a high calcium intake of at least 2 g. daily. While this intake of calcium can do no harm to subjects with normally functioning parathyroids, in tetany with damaged parathyroids and a diminished calcium excretion it would lead to an unnecessary storage of calcium. Some observations reported in this paper confirm (Himsworth and Maizels's findings in 1940) that vitamin D (calciferol) can raise the reduced serum calcium of parathyroid tetany. When given in adequate doses of 100,000 I.U. daily it raised the serum calcium despite a low calcium and high phosphorus content of the diet (i.e. case 1 in tables I and V). In view of the nature of the disturbed calcium metabolism in cured thyrotoxicosis and parathyroid tetany, when these diseases occur in the same patient a suggested line of treatment would be as follows.

1. Large doses of calcium, such as 7 g. of the carbonate or 22·5 g. of the lactate daily, should be given for about a year postoperatively to correct the demineralisation resulting from the thyrotoxicosis.

2. The calcium intake should then be reduced to normal requirements (0·7–1 g. daily) and calcæmic doses of vitamin D given (60,000–200,000 I.U. daily according to McLean (1941). The action of vitamin D in such doses resembles that of parathyroid hormone in supplying calcium to the blood-stream from the bones. The serum calcium can be determined from time to time, thus ensuring that no hypercalcæmia results.

In determining the effect of various therapeutic agents on the serum-calcium level in parathyroid tetany account must be taken of regeneration of, or the presence of

accessory, parathyroid tissue. These factors appear to come into play during the year after the attack of tetany. For comparative studies the blood for calcium estimation should be withdrawn at standard times in relation to food and medicines.

SUMMARY

A series of seven cases of parathyroid tetany of 3½–11 years' duration have been investigated.

Thyroid feeding depressed the serum calcium and had no effect on the serum inorganic phosphorus. The serum phosphatase was diminished in tetany and thyroid feeding raised it to normal.

The ingestion of 3 g. of calcium daily, as the lactate, chloride or phosphate, for two weeks produced no significant changes in the serum calcium or inorganic phosphorus.

Significant elevations of the serum calcium were found two hours after the ingestion of calcium lactate and carbonate. Calcium phosphate produced no significant rise in the serum-calcium level. The ability to raise a depressed serum calcium appears to depend not on the solubility of the calcium ingested but on its acid radicle.

Ammonium chloride in doses of 3 g. daily for two weeks produced a mild acidosis, but was without effect on the serum calcium or inorganic phosphorus.

Vitamin D (calciferol) in doses of 100,000 international units daily for two weeks produced very significant elevations in the serum calcium and was without effect on the inorganic phosphorus.

After an attack of parathyroid tetany parathyroid tissue seems to regenerate. Despite this regeneration or the presence of accessory parathyroid tissue the serum calcium still falls far short of normal.

The treatment of parathyroid tetany when it complicates the cure of thyrotoxicosis should include the ingestion of large doses of calcium salts only until the decalcification of thyrotoxicosis has been corrected. Thereafter the treatment should aim at imitating the action of parathyroid hormone. Vitamin D (calciferol) in adequate or calcæmic doses had such a therapeutic effect.

I am grateful to Prof. E. C. Dodds for his criticism of this paper; Mr. A. L. Bacharach of Messrs. Glaxo Laboratories for generous supplies of calciferol and for help on statistics; Mr. S. H. White and his staff of the Pharmaceutical Department, Middlesex Hospital, for much helpful advice; and the honorary staff of the Middlesex Hospital for permission to investigate their cases.

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ASSOCIATION OF SCIENTIFIC WORKERS.—This society is holding a conference on science and the war effort at the Caxton Hall, Westminster, on Jan. 10 and 11. Further information may be had from the conference secretaries of the association, 30, Bedford Row, London, W.C.1.

RESECTION OF HEAD OF PANCREAS AND DUODENUM FOR CARCINOMA

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THE first successful resection of the duodenum and a portion of the pancreas for carcinoma involving the ampulla of Vater and adjacent pancreatic head was reported by Whipple, Parsons and Mullins (1935). Later, Whipple (1938) collected and reported on 11 cases in which duodenectomy and partial pancreatectomy had been performed for malignant growths localised to the lower reaches of the common bile-duct or to the head of the pancreas, and of these 6 survived operation.

The operations were, in many essential respects, similar two-stage procedures. At the first operation, biliary obstruction was overcome by anastomosing the gall-bladder to the stomach or to a loop of proximal jejunum, after which a posterior gastrojejunostomy was performed. The first operation was completed by ligating the supraduodenal portion of the common bile-duct and by tying the gastroduodenal artery in continuity in order to diminish the blood-supply to the carcinomatous area. After an interval of 2–3 weeks, by which time it was hoped that the patient would show an all-round improvement following an intensive course of treatment, the second operation was carried out. This consisted in thoroughly mobilising the duodenum and the head of the pancreas by Kocher's method, transecting the antrum of the stomach close to the pyloric ring or dividing the beginning of the duodenum between crushing clamps, after which the distal part of the third portion of the duodenum was divided between enterotomes, and a generous wedge-shaped area of the head of the pancreas, or maybe the entire head, up to or including its attenuated neck, was cut away together with the attached and now liberated U-shaped duodenum. After this wide resection the proximal and distal duodenal stumps embraced by the enterotomes were oversewn with silk and securely invaginated with purse-string sutures. The duct of Wirsung was, as a rule, picked up and ligatured, the oozing cut surface of the pancreas oversewn with a continuous locking stitch and then finally sealed off with an omental graft. The operative field was drained with a strip of corrugated rubber, a Penrose tube, or a piece of guttered plastic glass. In some of the cases the abdominal incision was closed with a series of through-and-through interrupted sutures of stainless alloy steel wire to guard against the possibility of dehiscence of the wound or post-operative eventration.

Orr (1941) gives a detailed and tabulated account of all the cases which have been reported to date. Of the 15 patients subjected to these two-stage radical excisions, 5 (33·3%) died as a result of the operation, while of the remaining 10 patients, 3 later succumbed to metastatic implants in the liver, 2 from stenosis of the stoma which had been fashioned between the gall-bladder and the stomach or between the gall-bladder and a loop of proximal jejunum, and 1 from bile peritonitis. Only 4 were alive at the time of his publication. These figures are so disheartening that one may well ask if such heroic measures as partial pancreatectomy and duodenectomy for carcinoma are, in fact, justifiable. On the other hand, it is well to remember that many of the tumours of the head of the pancreas and of the ampulla of Vater are localised and resectable even at the time of the patient's death; that 60% show no evidence of metastases at operation or at autopsy; that the majority are lethargic in growth and are comparatively benign in character; and that in the present state of our knowledge radical resection offers the only hope of cure.

In my opinion, success in this difficult field of visceral surgery is not likely to be achieved in the future unless cases of obstructive jaundice are submitted to inquiry by operation more promptly than obtains at the present time, and until the technical details of the two-stage procedure, as so accurately described by Whipple (1938), Brunschwig (1937), Illingworth (1939), Moreland and Freeman (1941), and Ransom (1938) are thoroughly mastered by abdominal surgeons. Illingworth (1939) was the first British surgeon to publish a case of resection of the duodenum and head of the pancreas by this two-

stage method. His patient, after putting up a splendid fight, died from bile peritonitis on the 43rd post-operative day.

The following is an account of a case of carcinoma of the ampulla of Vater, in which during the performance of a straightforward cholecystectomy for cholesterosis and gall-stones a small cancer of the terminal part of the common bile-duct unfortunately escaped detection; but 6 months later it was possible to restore the patient to health by the radical two-stage procedure.

CASE-HISTORY

A married woman, aged 53, was admitted to the Southend General Hospital on May 10, 1940, complaining of flatulent dyspepsia and attacks of bilious vomiting. She stated that for some 2–3 months she had suffered from wind and a feeling of distension after meals and that there would be a dull aching pain in the pit of the stomach or below the right rib, which at times passed through the centre of the back. There was no history of jaundice or attacks of biliary colic, although about ten days before admission she had had what she described as a bilious attack for 2 days, during which time she vomited large amounts of frothy, yellow-stained fluid. Her bowels worked regularly and the motions were dark brown in colour. There were no symptoms referable to the urinary or genital tracts. She was a sallow thin patient in good condition; heart and lungs clear; some tenderness in the region of the gall-bladder which, however, was not palpable. No mass could be detected in the abdomen. Rectal and vaginal examinations were negative. A complete blood investigation showed a slight degree of secondary anæmia. No abnormal constituent could be detected in the urine. A Graham dye-test supported the diagnosis of chronic cholecystitis associated with gall-stones. A barium meal X-ray examination was not carried out, nor were specimens of the stools tested for occult blood.

First operation: cholecystectomy.—On May 22 the abdomen was explored through a right subcostal muscle-splitting incision. The stomach was normal; there was no evidence of duodenal ulcer; the gall-bladder appeared normal but contained three small stones. After displaying the three ducts, a retrograde cholecystectomy was undertaken. As the biliary passages appeared healthy and contained no calculus, they were not probed nor was the head of the pancreas or the second portion of the duodenum examined. The abdominal incision was approximated in the usual manner and a rubber drain was led down to the stump of the cystic duct. The excised gall-bladder was slit open and examined. It was a typical strawberry gall-bladder containing three cholesterol stones. Postoperative convalescence was stormy and in spite of gastric aspiration with a Ryle's tube the patient had several bouts of intractable vomiting. She rapidly became dehydrated and emaciated in spite of intravenous infusions and other supportive measures including blood-transfusions. A barium meal X-ray examination was attempted but this failed in its object as the patient collapsed during the screening. Shortly after this she improved slowly, the vomiting ceased altogether, she gained in weight, and was eventually discharged to a convalescent home on June 16.

She was readmitted to the General Hospital on Dec. 6, 1940, nearly 6 months later. According to the case sheet, three weeks after leaving hospital she had had another attack of abdominal pain and this was followed by vomiting. The attacks became recurrent, 12 days being the longest free period. In the attacks she got gradually increasing distension of the upper abdomen, accompanied by colicky pain; then she would vomit large quantities of bitter fluid. She had recognised food taken on the previous day in the vomited material. She said she had lost 1½ st. in weight in 4 months and that she was steadily going downhill. She was pale, thin and weary; heart and lungs clear; blood-pressure 110/70 mm. Hg. Abdomen: scar sound, but much epigastric distension and gurgling and splashing sounds elicited on palpation. No mass felt. Nothing abnormal discovered in the pelvis. Blood examination showed a fairly severe microcytic anæmia. The urine was free of bile, but contained a trace of albumin. Barium meal X-ray examination: stomach and duodenum distended, with an appearance suggesting either a filling-defect due to neoplasm in the second part of duodenum, or an obstruction due to bands.

Second operation: gastrojejunostomy and duodenotomy.—On Dec. 8 the abdomen was opened through a long right upper transrectus muscle-splitting incision. It was at once evident that satisfactory exploration was impossible until the bloated stomach, which occupied the entire upper abdomen, was deflated. The anæsthetist was accordingly instructed to pass a small Ryle's tube through the nostril into the stomach, and when this was done the viscus immediately collapsed. The first and second parts of the duodenum were much distended and the muscular coats hypertrophied. On invaginating the anterior wall of the second portion of the duodenum opposite the papilla of Vater, a circular ulcer with a diameter of approximately 1 in. and with hard everted rolled-over edges could be felt projecting into the lumen of the gut. The tumour mass could be traced to the adjacent portion of the head of the pancreas which was of metallic hardness and inflexible. The whole tumour could, however, be pulled upwards and moved freely from side to side, and did not appear to be anchored to the vulnerable inferior vena cava. The anterior wall of the second portion of the duodenum was incised for 2 in., and after retracting the edges of the gut with Allis forceps and sucking out the contents of the duodenum with a suction tube a good view of the interior of the duodenum with its contained cancerous ulcer could be obtained. The duodenotomy incision was then closed with a three-tier suture and a posterior gastrojejunostomy with a vertical stoma was fashioned without the aid of clamps. No enlarged lymph-nodes could be felt in the region of the growth, and the liver surface was smooth and even. The common bile-duct was moderately distended, and I was tempted to complete the first stage of the operation by anastomosing the choledochus to the small intestine. However, after the gastrojejunostomy the patient was in poor condition, so the abdominal incision was closed expeditiously with a series of interrupted floss silk sutures. The gastroduodenal artery was not ligated in continuity nor was a fragment of the tumour removed for microscopic investigation. The patient had an uneventful convalescence after the first-stage operation and was able to take fluids and semi-fluid nourishment without restraint; but towards the end of the second postoperative week the conjunctivæ became noticeably tinted with bile and the motions were putty-coloured.

Third operation: excision of duodenum and head of pancreas, choledochojejunostomy and entero-anastomosis.—On Dec. 28 the previous vertical epigastric incision was reopened and the silk sutures were removed. The pylorus and the first, second and third parts of the duodenum were liberally freed and mobilised. The portal vein was exposed and a number of tributaries were found running into it from the first and second parts of the duodenum. Some of these veins were very large and thin-walled. Each was ligatured in two places with fine silk, and then divided. The pyloric antrum was transected between clamps and the proximal end of the stomach invaginated and buttressed with adjacent omentum. The common bile-duct, which was about the size of my middle finger, was cut across low down between hæmostats, and the duodenum and the growth were freed from the right side and pulled over to the left (medially) together with the head of the pancreas. The neck of the pancreas was then divided between hæmostats, and the remaining stump was oversewn and covered with an omental graft. The third part of the duodenum towards the duodenojejunal flexure was severed between the crushing forceps, and the distal end invaginated with a silk purse-string stitch. The growth, the duodenum and the head of the pancreas were then removed intact. A loop of proximal jejunum some 18 in. below the previous gastrojejunostomy was brought up over the transverse colon to the cut end of the common bile-duct and an end-to-side anastomosis was performed, two layers of continuous sutures of fine silk being used. After this a small side-to-side anastomosis between the ascending and descending limbs of jejunum was made to deflect the intestinal contents away from the biliary passages.

The operative field was drained with a large piece of corrugated rubber and the abdominal incision drawn together with interrupted sutures of floss silk and deknatel. The ducts of the pancreas were not specifically seen after the neck of the gland was transected, but were merely oversewn with a running mattress suture and protected with a pad of omentum.

Postoperative progress.—It took the patient about 6 weeks to recover from this operation. The abdominal wound became infected and there was considerable discharge of thin purulent fluid through the lower portion of the incision. After extraction of the silk sutures the wound slowly healed, leaving a raised keloid scar. The jaundice subsided in the third postoperative week. The stools were pale brown and semi-fluid for about 17 days, but after that they were well-formed,

dark brown and inoffensive. There was no diarrhœa. The patient was given an alkaline mixture containing iron and arsenic 3 times a day; pancreatic extracts; and a semi-solid diet rich in fats, sugars and the essential vitamins. She slowly gained in weight, and was discharged from hospital on Feb. 6, 1941. She was re-examined on June 31, when she was well, had gained a stone, and was doing her own cooking. On Aug. 6 the surgical registrar saw her and stated that she was looking well. The stools were formed, she was taking pancreatic extract and having only one bowel action a day with the aid of paraffin.

Pathologist's report.—The specimen consists of the pyloric end of the stomach, the first, second and about half of the third portion of the duodenum, and the whole head of the pancreas, a portion of the neck of the gland and the lower portion of the common bile-duct. There is a circular malignant ulcer with a diameter of approximately ¾ in. occupying the second part of the duodenum and involving the papilla, the ampulla of Vater and the adjacent head of the pancreas. A probe can be passed through the common duct and then through the centre of the base of the malignant crater. The carcinomatous process appears to have begun either in the ampulla of Vater or in the papilla itself. On microscopical examination, the growth was a columnar-celled, tubular carcinoma, exact site of origin doubtful. Only a small area of pancreas was involved in the malignant process.

SUMMARY

The first successful resection of the duodenum and of the whole or a portion of the head of the pancreas including the neck, for carcinoma involving the lower reaches of the common bile-duct and adjacent pancreatic head, was reported in 1935.

Since then only 15 patients have been subjected to two-stage radical excisions. These consisted of a preliminary cholecysto-enterostomy or choledocho-enterostomy combined with gastrojejunostomy and followed some two weeks later by a wide resection of the duodenum and the head of the pancreas.

Of these 15 patients, 5 died as a result of the operation, while of the remaining 10 patients, 3 later died from metastases in the liver, 2 from stenosis of the stoma which had been fashioned between the gall-bladder and the stomach or between the gall-bladder and a loop of proximal jejunum, and 1 from bile peritonitis. Only 4 are alive today.

Only 1 case of successful resection of the duodenum and a portion of the pancreas involving the ampulla of Vater for carcinoma has been reported in Britain. This patient died on the 13rd postoperative day from general peritonitis.

An account is here given of the radical treatment of cancer of the head of the pancreas and of the ampulla of Vater by the two-stage procedure, and a case-report is presented. The patient enjoyed fairly good health for nine months, but died from implants in the liver eleven months after the last operation.

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Reviews of Books

Conditioned Reflexes and Psychiatry

Vol. II.[1] IVAN PETROVITCH PAVLOV, late director of the physiological laboratories of the Institute of Experimental Medicine, Leningrad. Translated and edited by W. HORSLEY GANTT, M.D. London: Lawrence and Wishart. Pp. 199. 8*s*. 6*d*.

FEW psychiatrists have appreciated the zest and thoroughness with which Pavlov applied himself to the study of their problems in the last eight years of his life. His physiological method was valid for this field too, he believed, and he set himself to apply the lessons learned by animal experiment to the abnormal behaviour of human beings, so variously interpreted by psychologists. The scattered lectures and articles in which his arguments and conclusions were advanced are now brought together; whether they can help the clinician to do his work better or can stimulate fruitful research is still a doubtful question, but the brilliance and honesty of the attempt are beyond dispute. No-one would guess from internal evidence that these were the writings of a man who had been unacquainted with clinical psychiatry until he applied himself to it at the beginning of his ninth decade. In 1930 he spoke of the need to promote "the natural and unavoidable approximation and final fusion of psychology with physiology, the subjective with the objective. . . . The most common example of this blending obviously exists in mental diseases." He therefore made it his business to see a great many psychiatric cases, but he did not make vain pretensions; thus in 1934 he wrote "I am no clinician—I have been and remain a physiologist—and, of course, at present, so late in life, would have neither the time nor the possibility to become one." Clinical psychiatrists will none the less learn from his suggestions. The book follows on the "Lectures on Conditioned Reflexes," and the two volumes contain all Pavlov's published lectures from 1903 until his death. The translation has been admirably done by Dr. Horsley Gantt, whose years of study and friendship with Pavlov qualify him for the task. Dr. Gantt has written, as an introduction, a critical appreciation and biographical sketch of Pavlov's closing years which is vivid and just.

1. Volume I, which has been out of print, is now also available. (Price 12*s*. 6*d*.

Ophthalmic Nursing

(3rd ed.) MAURICE H. WHITING, M.B. Camb. F.R.C.S. London: J. and A. Churchill. Pp. 157. 6*s*.

THE new edition of this popular book should be specially useful in training nurses without previous experience of ophthalmic work. The early chapters on anatomy and physiology are concise but sufficient, except perhaps that a fuller description of the orbit would help to clarify the relations of the eye and the nose. The second half of the book gives sound advice on the nursing of operative and non-operative cases, and on theatre technique, but there are one or two omissions; for example, the actual technique for obtaining a conjunctival culture is not explained, and the nurse is not told how and when to sterilise ocular drops and lotions. The upkeep and care of special instruments such as the tonometer, perimeter, slit-lamp and Edridge Green lantern should be included, since these are maintained by the outpatient nurse, and a description of the ring or Haab giant magnet would add to the interest of the book. More emphasis might have been laid on the importance of knowing the type of injury commonly associated with an intraocular foreign body, and a busy staff nurse would welcome a more convenient way of examining the eyes of an obstreperous child than the one described. The section on the value of sulphonamides might mention their curative value in hypopyon ulcer. Gas injuries of the eye based on experience in the last war are well described, but it is a pity that nothing is said of injuries caused by incendiary and explosive bombs in this one.

A Textbook of Physiology

(7th ed.) W. D. ZOETHOUT, Ph.D., and W. W. TUTTLE, Ph.D. London: Henry Kimpton. Pp. 743. 22*s*. 6*d*.

THIS American book has deservedly run through many editions; it is a complete elementary review of physiology and takes in such aspects of general and chemical physiology and histology as are necessary. It has been kept well up to date, and the illustrations, a mixture of the new and the rather old-fashioned, are instructive. The chapters are introduced by a list of cross references to related topics, the derivation of new terms is indicated, and at the end are a glossary of technical terms and a list of prefixes and suffixes. The work fully meets the needs of those studying physiology up to a standard somewhat lower than that required of medical students; but the balance of the book is so good that it would serve admirably as a jumping off place for independent folk who like to cull their knowledge from various sources.

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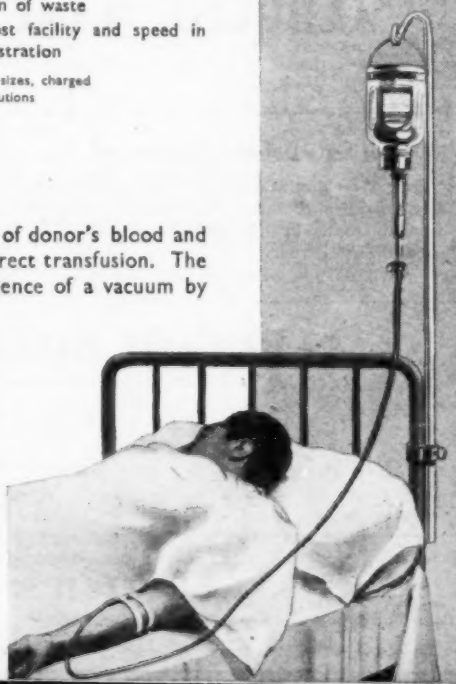

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(R. Marinkovitch : Lancet No. 5, Vol. I. 1941, p. 144)

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THE LANCET

LONDON: SATURDAY, DECEMBER 27, 1941

WHEN DOC MEETS DOC

"It isn't the prescription that I give," said a great physician, "but the pat on the shoulder with which I give it."

"There is one thing at which the G.P. is supreme, and that is psychology."

"That eyewash, suggestion, or what-you-will that does the ordinary patient a power of good."

THUS among ourselves do we describe, in varying terms, that aptitude for handling the sick man's mind which TROTTER included among the attainments of the good doctor. As we grow older we tend to play upon it; we have said the same thing so often and still have to say it again, and say it as though it were entirely new and the product of the most recent research. One will sit down slowly in his chair looking at the window while he glances at the patient to see that his mind is tuned in to the oracle and will blurt it out or slowly roll it over his tongue according to his judgment of the patient's mentality. Another will wash his hands and begin as he picks up the towel, finally bringing out his most impressive sentence as he puts it down again with a little jerk. As we pocket our fee we may think what an old scoundrel we have been, but one day, being tired or pressed for time, we omit some part of our technique and fail to get our advice across. So the by-play is an essential adjunct to the advice. This is with the ordinary patient; but what when the patient is a doctor? All must then go by the board. The doctor knows the tricks of his neighbour's trade; he has too often seen that flick of the towel and may even have copied it himself. Then it is apt to be: "Well, old man, you might try such and such, though I don't suppose it really does any good," or "By all means have some radiotherapy, though as you know it has no specific action on the tissues"—plain, unadulterated science with no art to back it up.

Should this be so? The doctor is as human as anyone else, with fears and anxieties of which the layman knows nothing and which are more difficult to allay. The successful doctors' doctor must use another and a more tedious technique. This is likely to include a great expenditure of time, a repetition of examination, a lengthy critical discussion in an undertone, and a complete absence of all those trivialities which some call humbug—the very characteristics, in fact, which do not attract the ordinary patient. Every teaching hospital carries on its staff one man who knows this technique to perfection, but knows no other. Such a man has but little practice, though doctors flock to him when wives and children's lives are at stake. Many a doctor owes the life of his wife or firstborn to him and yet has never been able to send him a paying patient. He is fortunate if he has private means, for man cannot live on gratitude and presentation silverware alone.

This relationship of doctor to doctor may be fraught with risk. A frightened junior may ask his senior about some lesion at that time slight but with grave potentialities. Thus a young surgeon pricked his thumb when doing an acute streptococcal mastoid. Next day an ominous red line had reached his wrist, and he said casually to his chief "Look at this; would you lie up with it?"—and his chief as casually replied "I shouldn't." He did not realise that that young man was frightened for his life, but was more afraid to show it, and this was his way of asking his chief to be his doctor. A junior at two hospitals asked two seniors to wash out his antrum from time to time; and each did so thinking the other was in charge of the case and that he was merely doing a bit of handicraft to help. An acute pan-sinusitis supervened with septicæmia. No tragedy came of these cases, but there have been others—not always on the surgical side and not always in hospital—where a young doctor's life has been cut short because he has had no real medical attention at all. The moral is this. Refuse to discuss a doctor's ailment with him unless you are being asked to treat him. But if you are, don't let him share the responsibility; treat him as you would any other patient. And when you yourself are ailing choose your doctor as decisively as you choose your solicitor, and put yourself as unreservedly in his hands.

HEAD INJURIES

JUDGING by the amount being written about them there is a growing realisation of the importance of head injuries, so that these cases may no longer be stuck away in the corner of a hospital ward as something of a nuisance and left to run their course. The total number of head injuries resulting from air-raids has been nothing like as large as was expected, but SHEPHERD found 14% of such injuries in a series of 245 air-raid casualties reported on another page, a heavier incidence than in any other regional group, and the increase in road accidents brought about by war-time motoring has accounted for many more cases. Much can be done in the way of prevention. Protective headgear for the fighting man went out of fashion with the transition from hand-to-hand combat to the lead and steel missile, but the reappearance of the steel helmet in the last war undoubtedly saved many casualties. In less serious pursuits, American footballers have for long worn a padded leather helmet to lessen the incidence of concussion in that robust game, and from the speedway and dirt-track we learned the virtues of the crash helmet, especially for motor-cyclists. CAIRNS's studies in this war are a cogent argument for insisting that all motor-cyclists should adopt this simple and efficient protection. Industrialists have been slow to learn these lessons, but MILLER[1] reports that the incidence of head injuries among the South African miners has been greatly reduced by the adoption of the "hard hat," and the fashion will doubtless spread among other classes engaged in dangerous occupations. The appalling number of road accidents demands, even in these times, a more vigorous and persistent propaganda campaign for safer use of the roads by motorist, cyclist and pedestrian alike.

Most recent writers emphasise the importance of proper treatment of the scalp wound. Too often these wounds suppurate, with grave or even fatal complications. Adequate excision and thorough cleansing are first principles, but the possibility must

1. Miller, L. E. *Sth Afr. med. J.* 1941, **15**, 331.

be borne in mind that an apparently trivial scalp wound hides a penetrating wound of the skull or brain for which something more is required, and a good case can be made for X-ray examination in every case not obviously a simple laceration. A problem as yet unsolved is the correct treatment of traumatic cerebrospinal rhinorrhœa, usually resulting from a fracture through the frontal or ethmoidal air sinuses. O'CONNELL [2] considers that immediate closure of the fistula is not necessary, and the natural barrier formed by the scar is at least as good protection against infection from the air sinuses as is an artificial closure reinforced with a fascial graft. Others have had the unhappy experience of meningitis arising in the early days after the injury, perhaps while spontaneous closure is being hopefully awaited, and in some of these cases chemotherapy will not save the patient's life. There are cases too of a fistula apparently closing spontaneously, only to leak again some weeks or months later, and a fulminating meningitis may be fatal before treatment can be instituted. Because of these risks some maintain that early closure of the fistula is preferable to the uncertainty of spontaneous healing. No single person's experience is yet large enough to justify definite pronouncement, but if the centres dealing with large numbers of head injuries are keeping records and following these patients the answer should be forthcoming in a few years. The treatment of compound fractures of the vault is more generally agreed on, but the same cannot be said about what should happen to a foreign body lodged at some depth in the brain. There seems no doubt that unless the search can be made by someone accustomed to the technique it is better not made at all. Even in the hands of specialists more harm and disability may result from removing a foreign body than from leaving it where it is. Individual cases will have to be dealt with on their merits, with the balance weighted in favour of conservatism.

Not enough has yet been said about rehabilitation. There are special centres for dealing with head injuries and their sequels in the military population, but the problem in these cases is often complex and not strictly applicable to civil life. There is a need for similar centres for civilian injuries, and the insurance companies might find it to their advantage to make a start in this direction. The present machinery of litigation and compensation often perpetuates the invalidism from these as from other injuries, and a rehabilitation centre should be able to give decisions which would shorten the period of invalidism. Apart from such institutional treatment we need to get away from the rule-of-thumb treatment of concussion—some cases need only three days in bed, while others may require three weeks or longer, depending on the individual's reaction to the injury. The lay public needs to be weaned from the idea that a person who has had a fractured skull is necessarily maimed, mentally or physically. With this belief would go the darkened room and the dark glasses, and the whole panoply of a mental illness. If the patient recovers from the injury without gross cerebral damage he should be expected to make a fairly complete mental and physical recovery. Anything short of that in the great majority of cases would imply faulty management in the early stages of convalescence.

2. O'Connell, J. E. A. *Lancet*, Dec. 13, 1941, p. 719.

REFRACTORY ANÆMIA

WHEN the hæmopoietic property of liver extracts and the proper use of iron salts were firmly established it seemed as if treatment of the primary blood disorders would henceforth be simple and satisfactory. From the first it was recognised that leukæmia and the classical aplastic anæmia had to be excluded and that certain hæmolytic anæmias required special treatment; but these were a minority. The pathologist's report showing an anæmia with a high colour-index was thus the signal for liver extracts and a favourable prognosis. Mostly this optimistic forecast was fulfilled, but sometimes the response was disappointing—liver extracts were changed, iron was given, in the end blood-transfusion was usually needed and the outlook was gloomy. These unfortunate patients were in such striking contrast to those who responded normally to treatment that they were soon noticed and reports of "pernicious anæmia refractory to liver treatment" began to appear. In 1936 ISRAËLS and WILKINSON [1] showed that there was in fact a group of patients in whom the clinical features, blood-picture, and histological changes in the bone-marrow closely resembled pernicious anæmia but who, in varying degrees of completeness, failed to respond to liver extracts of tested potency; a notable point was that achlorhydria, so typical of true pernicious anæmia, was not present. This group was named achrestic anæmia and later [2] it was reported that sternal-marrow biopsies studied by the dry-smear technique were also of the pernicious-anæmia type with megaloblastic hyperplasia. Other writers have reported patients in whom a normoblastic hyperplasia of the marrow was found and who similarly failed to respond to treatment; this anæmia was sometimes called "pseudoaplastic."

The same problem forced itself on the attention of workers at the Rockefeller Institute in New York and in 1939 C. P. RHOADS [3] summarised the conclusions reached. After all anæmias which could be attributed to cancer, Hodgkin's disease, nephritis, cirrhosis of the liver or leukæmia had been rigidly excluded, there remained a group of primary anæmias whose course did not respond to any of the standard treatments; these were intensively studied and a full report has recently been given by BOMFORD and RHOADS [4] on 66 such cases. The natural history was carefully noted; the histology of the bone-marrow was studied by sternal biopsy and at autopsy; fractional gastric analyses were made; changes in the urobilinogen excretion were used to estimate liver function; porphyrin excretion was studied and the copro-porphyrin isomers were isolated in 6 cases; the excretion of glucuronates was used as a measure of "detoxifying capacity"; some other tests were applied as well. Yet the picture presented by all this detail is confused, if not chaotic. A not very successful attempt has been made to classify the cases according to the histological changes in the marrow. It is possible that use of the dry-smear sternal-puncture technique, adopted by several hæmatologists with encouraging results, might have made this classification more precise; but it is clear that pathological

1. Israels, M. C. G. and Wilkinson, J. F. *Quart. J. Med.* 1936, **5**, 69.
2. *Ibid*, 1940, **9**, 163.
3. Rhoads, C. P. Symposium on the blood and blood-forming organs. University of Wisconsin, Madison, 1939, p. 31.
4. Bomford, R. R. and Rhoads, *Quart. J. Med.* 1941, **10**, 175 and 235.

changes in the bone-marrow are only part of the story. Discussion of the relative value of all this evidence must still be left to the expert, but it is useful to see what impressions have been gathered about the ætiology of these cases and what practical experience has taught about their management.

RHOADS is struck by the resemblance between the refractory anæmias and those anæmias, whose course is also independent of treatment, which are known to be due to exposure to "potentially hæmotoxic" aromatic hydrocarbons, and included in the reported series are 34 cases of refractory anæmia in which the patient had been exposed to benzol, paraphenylene-diamine (a hair-dye), analgesics like pyramidon and phenacetin, and some other similar substances. He also recalled that somewhat similar anæmias had been experimentally produced in animals by substances like indol and œstrin. Only a few of the people exposed to these hæmotoxins develop refractory anæmia and it is therefore necessary to postulate a conditioning factor or state. Dietary deficiencies or endocrine disturbances could only be detected in a minority of cases but evidence of liver disturbance or failure of the biochemical mechanisms for detoxicating aromatic hydrocarbons was observed more frequently; an increased rate of hæmolysis was also noted. BOMFORD and RHOADS suggest, as a working hypothesis of the ætiology of refractory anæmia, a conditioned susceptibility to aromatic hydrocarbons to which the patient has been externally exposed or which are being produced in the body itself in the course of normal metabolism; this susceptibility is associated with a disturbance of liver function and detoxicating mechanisms and with the circulation of hæmolytic substances which not only affect the red blood-cells but also their precursors in the bone-marrow. This theory is still too tentative to be applied to treatment which consequently remains empirical and unsatisfactory. Removal from exposure to toxic substances is an obvious measure and should include the abandonment of all sedative drugs containing aromatic hydrocarbons. The diet should be adequate in all respects and supplementing the diet with vitamin-B complex is especially recommended; BUNDING [5] in a recent German report also supports this measure. If sternal puncture shows a negaloblastic marrow it is useful to follow ISRAËLS and WILKINSON'S recommendation to give liver extract—the more refined forms should be avoided. When all this is done the mainstay of treatment is blood-transfusion, which should be repeated as needed since a fair proportion of patients eventually show remissions which may be prolonged and occasionally permanent. Careful cross-matching is essential since the severely anæmic patients are particularly liable to post-transfusion reactions. BOMFORD and RHOADS believe that transfusions should be used sparingly and are not in favour of raising the hæmoglobin to 70 or 80%—a procedure which has its supporters [6] especially by the method of giving concentrated red cells.[7] Transfusions should be continued however bad the outlook may seem. As it may be necessary to sustain one of these patients with other people's blood for months or even years, the outlook is indeed grim both for patient and doctor, and it is not easy to decide how long it is proper to wait for signs of remission.

Here then are a group of patients whose blood-picture may resemble treatable anæmias but who in practice prove refractory to the known hæmopoietic drugs. Their ætiology is still speculative and their treatment empirical. The doctor can at present do little more than note their occurrence and resolve to be cautious in prognosis until the effect of treatment becomes clear. No patient should, however, be diagnosed as primary refractory anæmia until a thorough survey of the known causes of anæmia has been made.

5. Bunding, A. *Dtsch. med. Wschr.* May 30, 1941, p. 591.
6. Scott, R. B. *Quart. J. Med.* 1939, **8**, 127.
7. MacQuaide, D. H. G. and Mollison, P. L. *Brit. med. J.* 1940, **2** 555.

HIGH FLYING

A GROUP of Boston workers [1] have again emphasised the difficulties in flying at over 32,000 ft. even when oxygen is supplied. Oxygen constituting as it does a fifth of the atmosphere exerts at sea-level a pressure of 152 mm. Hg, being a fifth of the total atmospheric pressure of 760 mm. Although its absorption into the blood depends on its pressure, it is normally absorbed at a pressure nearer 100 than 152 mm. Hg. This is first because the high water-vapour content of the alveoli cuts down the space available for the remaining atmospheric gases and reduces their total pressure from 760 to about 710 mm. Hg and secondly because whereas in air oxygen would account for 142 of the 710 mm., so much of it has been exchanged in the lungs for carbon dioxide that the remainder exerts little more than 100 mm. pressure. Up to a point, diminished entry of oxygen into the blood causes no symptoms; the acute discomfort of breath-holding is due entirely to the rising alveolar pressure of carbon dioxide, to which the body is extremely sensitive. At low atmospheric pressure, if pulmonary ventilation remained unchanged, two physical conditions would control the gaseous exchange in the alveoli: alveolar air would still be saturated with water vapour which, exerting the same pressure as before, would account for a greater proportion of the total pressure; and the residual pressure would be divided between carbon dioxide, oxygen and nitrogen in the usual alveolar proportions, each of their pressures being reduced. In practice the sensitivity of the body to CO_2 intervenes. The diminished alveolar pressure of this gas allows it to escape more readily from the blood, so reducing the urge to breathe that CO_2 accumulates in the alveoli at the expense of oxygen. In rapid ascents this may lead to the insidious and disastrous results of anoxia. In ascents occupying days acclimatisation occurs, the control of breathing being switched from the CO_2-sensitive to an oxygen-deficiency-sensitive mechanism. This ensures sufficient hyperpnœa to keep the alveolar oxygen pressure as high as it will go, though CO_2 is, of course, lost, and alkali is excreted in the urine to keep the pH of the blood constant. The obvious way to avert anoxia in rapid ascents is to replace the nitrogen of the inspired air with oxygen, so that no matter how much room is taken up in the lungs by retained CO_2, sufficient oxygen is also present to exert an adequate pressure on the blood. At 19,000 ft. when the atmospheric pressure has gone down to 360 mm. Hg nearly half the air breathed must consist of oxygen if the pressure of this gas in the

1. Butler, A. M., Wilson, J. L., Smith, C. A. and Farber, S. *New Engl. J. Med.* 1941, **225**, 255.

alveoli is to reach the normal 100 mm. Hg. It has been suggested that even if this is achieved—so that there should be no stimulus to, or reason for, over breathing—there is excessive elimination of CO_2. This is not confirmed by BUTLER and his colleagues, who working with decompression chambers find that if the alveolar oxygen pressure is kept normal the CO_2 pressure also remains normal and there is no increase in the alkalinity of the urine. They did find however that rapid reductions of atmospheric pressure to 250 mm. Hg or less might give rise to symptoms resembling those of anoxia, though they were not due to this. They attributed these symptoms to liberation of nitrogen or water-vapour bubbles in the tissues—to the same kind of thing, in fact, as occurs in the rapid decompression of divers.

At over 32,000 ft. purely physical considerations begin to determine the limit of performance. Total atmospheric pressure is now only about 200 mm. Hg, of which only 152 mm. are available in the lungs after deducting water-vapour pressure. Thus even if pure oxygen is breathed the maintenance of a normal CO_2 pressure of 40 mm. Hg leaves just sufficient pressure of oxygen to saturate the blood. Above this height, pressure of oxygen inexorably diminishes, though at 40,000 ft. it is theoretically still sufficient to allow an 88% saturation of the blood. But animals exposed to such pressures of pure oxygen die, and ARMSTRONG[2] regarded 30,000 feet as the practical limit of safety. BUTLER and his colleagues point out another hazard when the nitrogen of the air is replaced by oxygen even at low pressure—that of fire, but in civil aviation the deciding factor in altitude is more likely to be the well-known effect of differences in pressure between the atmosphere and the middle ear. It seems that the multiple difficulties associated with very high flight can be overcome satisfactorily only by closed-cabin aircraft in which the atmospheric pressure is something like normal.

Meanwhile attention must be paid to favourable idiosyncrasies which may account for some aviators having a resistance to altitude slightly above the average. On the basis of the remarkable survival of thyroidectomised rats at a barometric pressure sufficiently low to kill all normal rats, BARACH, ECKMAN and MOLOMUT[3] suggest that a low metabolic rate may be an advantage. It is doubtful if they would have obtained such favourable results if they had reduced the temperature as well as the pressure of their exposure chamber so as to imitate more closely the conditions met in flying. Their less sensational finding[4] that twenty cigarettes bind an average of 5·7% of the total O_2-combining power of blood to CO may in practice prove more important, and we await with interest their projected experiments in which these findings are to be correlated with the actual demand of the tissues for oxygen.

2. Armstrong, H. G. Principles and Practice of Aviation Medicine, London, 1939.
3. Barach, A. L., Eckman, M. and Molomut, N. *Amer. J. med. Sci.* 1941, **202**, 336.
4. See also Hartridge, H. *J. Physiol.* 1920, **54**, 152.

THE directors of the Coöperative Wholesale Society Ltd. ask us to state that all national wheatmeal made by their mills is produced strictly in accordance with the specification laid down by the Medical Research Council. The average fibre content of their product, as revealed by analysis over a long period, is less than 0·8%.

Annotations

THE PROPER SCHOOL MEAL

ANYONE disheartened with the slow rate of progress of applied nutritional science in this country will be encouraged by the latest circular (No. 1571) of the Board of Education which sets out not only the principles upon which the provision of school meals should be based, but also the types and quantities of foods which are necessary. The first principle is that in planning a midday meal for school-children it is essential to consider the probable defects of their home diet. This is almost certainly lacking in first-class protein, fat, calcium, iron and the vitamins, and the board aim at making good these deficiencies, at any rate in part. For a dinner to provide about 1000 calories they recommend 20–25 g. of first-class protein, 30 g. of fat, and suitable amounts of vitamins and minerals. The second principle is that the nutritive value and not the low cost of the meal should be the first consideration and the board deplore that there "still are some instances where the authorised allowances of food have not been bought in full owing to a well-meant but mistaken effort to keep the price of the school dinner very low or even to make a profit for sports funds. . . ." Economy, they insist, should be studied "not by reducing the quantity or the quality of the food and staving off hunger with liquids such as soup, but by avoiding waste, by skilled buying and by good cooking." The board might well borrow a leaf from the bulletin of the Children's Nutrition Council and add: "by studying child likes and dislikes, by working within their ambit, and by subtly training the child to eat unwanted but nutritious foods."[1] The low table wastage at Christ's Hospital[2]—less than 1% compared with the average 10%—was achieved by these methods. A third principle is that no child should go without a nutritious midday meal because his parents cannot contribute to the cost. "If it is found that some of the parents cannot pay the full cost of the food the remedy is not to give a poorer meal, but to adjust the income scales so as to provide for meals on part payment, as well as for free meals. . . ."

And lastly there is the principle that cost of supervision and preparation of the meals must not be scamped, for the provision of "balanced meals" needs intelligence and training, and so costs more. "A skilled organising and catering staff is therefore essential and there is no true economy in offering wages too low to attract competent cooks and helpers." We prefer to ask for dietitians (or nutritionists as Americans call them)—though as yet we have trained far too few in this country to meet the demand—for there will be difficulty in interpreting the board's wishes from the lists given, as a guide to the quantities of the main foods to be used. Taking the full range of foods and using the quantity of dried milk allowed, the diet works out at 17 g. of first-class protein, 400 mg. of calcium, 4·3 mg. of iron, 900 I.U. (and possibly more) of vitamin A, 20+I.U. of vitamin D, 0·6 mg. of vitamin B_1 and 19 mg. of vitamin C per meal. This is a satisfactory diet, though the iron is low. But if liquid milk is used instead of dried milk in cooking it appears as though the first-class protein and the calcium will be considerably lower, because the liquid milk allowed is by no means equal to the alternative amount of dried milk. Again it is notoriously difficult to persuade children to eat carrots, cabbage and green vegetables, and it is a temptation to the cook to omit them from the diet and give the children those things which they will eat. Moreover, unless the cook is dietetically minded the menus will tend to become more and more what she herself likes to eat. There must therefore be a skilled dietetic supervision of the menus and of the children's likes and

1. War-Time Bulletin. October and November, 1941.
2. Friend, G. E. The Schoolboy, London, 1935.

dislikes, and attempts should be made, as in Aberdeen,[1] to induce them to eat unaccustomed but protective foods. The board have recognised that children must be proportionately better fed than adults; but to put this principle into practice they will need dietitians as well as cooks.

ALLERGIC EPILEPSY

EPILEPSY, with its recurring fits, is an obvious candidate for the allergic pigeonhole; and the papers that have been written about the wisdom of this course would themselves fill a good few pigeonholes. A study of these papers induces something of the state of bewilderment produced by a search for truth about current events in war-time. A valiant attack on the subject has recently been made by D. C. Dewar,[3] though one would hardly expect that the patients he investigated—chronic idiopathic epileptics in a mental hospital—would provide the most promising field. Strong prima facie evidence of a connexion between epilepsy and allergy was afforded by his finding that two-thirds of these patients (four times the proportion in a control group) gave either a personal or a family history of allergy, but he does not specify what conditions constitute allergy. To intradermal skin tests he found that 58% of his epileptics, as against 4% of controls, were positive, many of the former showing multiple sensitivity. Offending foods having been eliminated from their diet, twelve epileptics were treated by specific desensitisation. The intramuscular route was adopted, and in half the cases an attempt made to control dosage and avoid the risk of oversensitisation, and consequent increase of fits, by repeated eosinophil counts. Sensitivity tests made at the conclusion of the course of injections and again three months later showed that desensitisation had been achieved in most of the cases. A year later Dewar found that there had been a definite reduction, in one case a most dramatic reduction, in fit incidence in seven of the twelve patients; and the decrease in fits, as well as mental improvement, can be fairly well correlated with the degree of desensitisation. The value of the paper is greatly enhanced by full details of the techniques employed. The treatment of epilepsy as an allergic manifestation is of necessity a painstaking and laborious process; and brilliant results are likely to remain exceptional. Anyone who wishes to try it out should make a detailed study of this paper before he starts.

PHYSICAL TYPE IN PNEUMOCONIOSIS

PEOPLE who are exposed to apparently equal risks from pneumoconiosis-producing dusts do not, of course, all succumb to those hazards. One differentiating factor between the affected and the unaffected might lie in constitutional type, and indeed this view has not only been put forward but to some extent acted on in selecting entrants to the mining industry. The belief is that by excluding certain anthropometric types the incidence of pneumoconiosis, or of pneumoconiosis complicated by tuberculosis, could be reduced. Statistical data have so far been lacking and Aslett, Hart, Martin and Russell[4] give but little encouragement to the hypothesis. Their material is derived from part of the wide survey which has been made in South Wales under the direction of the industrial pulmonary diseases committee of the Medical Research Council. Measurements of 540 workers at an anthracite colliery were available and could be divided into groups of unaffected workers and those with pneumoconiosis of varying degrees. They comprise standing and sitting heights; weight; circumference, anteroposterior diameter, lateral diameter and length of the chest; and radiological measurements. From these various indices have been calculated as well, and comparison is made between the normals and the cases of reticulation, nodulation and major consolidation. The general result of this careful study is that there is little difference in bodily make-up between the affected and the unaffected. For instance, the average height differs negligibly so that there is no reason to think that the normals tend to be the "short and tubby" pyknics and the affected the "tall and thin" asthenics. While one or two of the indices—e.g., height/chest lateral diameter—suggest a slight association between type and reaction to the environment there is clearly no differentiation sufficiently well marked to permit the identification of the future pneumoconiotic case. To avoid recruiting those particularly susceptible to the dust hazard—if they really exist—is, it goes without saying, most desirable. There is, unfortunately, no evidence here that such guidance can be usefully based on bodily measurements.

3. *J. ment. Sci.* 1941, **87**, 608. 4. *J. Hyg., Camb.* 1941, **41**, 169.

PARALYSED PAPER

PAPER is badly needed for munitions of war, but most of us would rather do without a meal than give up a book or a packet of letters. It must be done, and done now, as our own contribution to the cause. And there is an added reason for a profession which has its own books and journals. The medical journals are feeling the pinch of paper shortage, and if this shortage becomes worse progress in medicine, and particularly the dissemination of new knowledge, will be held up by difficulty in getting new work published. Doctors themselves can do much to avert this threat, for we are among the larger users of paper and run lawyers a bad second as hoarders of it. Most of the compound celluloses from which our paper is made come from abroad and are not likely to be plentiful while war lasts, but fortunately paper, like currency, can circulate, and our aim must be to keep it circulating. The textbooks of our student days, now of historical interest only, the ledgers of thirty years ago, the incomplete and unbound sets of journals which we could not consult even if we would, these, with the old letters and out-of-date receipts which every literate household possesses, must go to the salvage authorities. A Sunday afternoon of selective rummaging will mean less dust in the home, more room in the attic, and new facts for old.

NOT SO STERILE WATER

MOST hospital bacteriologists are familiar with the non-purulent spinal fluid which on receipt at the laboratory yields a small gram-negative bacillus or other indeterminate organism. They have usually suspected these organisms to be contaminants from the so-called sterile water or saline in which the spinal needle is placed after boiling or with which it is rinsed after sterilisation in an antiseptic fluid. They will therefore be grateful to Professor and Mrs. Wilson Smith for showing by systematic investigation of 223 specimens of cerebrospinal fluid and 11 samples of "sterile water" used for rinsing the spinal needles that two-fifths of the spinal fluids were contaminated and that more than a third of the contaminants probably came from the sterile water. Besides the gram-negative water bacillus, which grows best in peptone water at room-temperature, *Staphylococcus albus*, coliform bacilli, diphtheroids, non-hæmolytic streptococci and other organisms were encountered, suggesting that spinal puncture is often carried out without regard to the ordinary rules of asepsis. The resulting contamination is irritating enough to the bacteriologist and may even lead the unwary astray, but the matter becomes much more serious when the same laxity of technique is used in the injection of spinal anæsthetics. Barrie[1] has reported 11 cases of meningitis with one death among 96 consecutive patients operated on under spinal anæsthesia in one theatre. The meningeal infection, which was seldom severe, was characterised by the abrupt onset of headache 7–10 days after operation, usually associated with drowsiness, irritability, photophobia

1. Barrie, H. J. *Lancet*, 1941, **1**, 242.

and neck rigidity. The cerebrospinal fluid, examined in 6 cases, showed evidence of a mild purulent meningitis. It seems pertinent to ask whether the severe headache which may follow spinal anæsthesia is not sometimes due to meninges infected in this way. In the induction of spinal anæsthesia, the anæsthetist should wear sterile gloves, the skin of the patient's back should be covered with a visible antiseptic like iodine, and the spinal needle should either be boiled and put in a dry sterile container or be previously sterilised in an autoclave or hot-air oven in an appropriate closed container. Boiled water or saline used repeatedly from a Winchester or other large bottle for rinsing or immersing sterile instruments and needles is very liable to become infected, as Bigger and Nelson [2] have shown, and this practice, all too common in hospitals, cannot be too strongly deprecated. Indeed, the need for a bacteriological control of hospital methods becomes ever more apparent.

TRAUMATIC ARTERIAL SPASM

THE local constriction of a vessel wall in response to trauma is a well-recognised phenomenon, apparent even in the injection of varicose veins. Operations on arteries are impeded by this spasm, and it has long been known that constriction of the severed ends may be sufficient to arrest hæmorrhage in severe arterial damage. Nevertheless, the importance of a local vasoconstrictor reflex in jeopardising the vitality of a limb which has been injured is not very well recognised. Last year Griffiths [3] cited traumatic arterial spasm as the cause of Volkmann's ischæmic contracture, and recently Cohen [4] has brought together clinical reports of a variety of cases illustrating effects produced by spasm of the intact vessel as a result of injury, and the type of treatment that can be applied with hope of success. He shows that simple exposure of the artery at the site of injury may be sufficient to arrest the spasm, though there is as yet no explanation of this remarkable fact. In his first case the injury was caused by a splinter of glass or of a bomb—it was not known which did the damage—passing through the arm just below the elbow-joint. The radial and ulnar pulses were absent, though they were easily palpable on the opposite side. There was a musculospiral nerve palsy. At operation six hours after admission it was found that the missile had just skirted the joint capsule, the nerve was contused but intact, and the biceps tendon was almost completely severed. The brachial artery was not pulsating, and was surrounded by a network of soft clot. For a distance of about 2 cm. proximal to the origin of the radial artery a fine blue stippling indicated bruising. A tourniquet was applied; the artery was freed from the clot and from a fine areolar tissue and pulsation returned as the tourniquet was released. The pulse after operation remained normal and the limb recovered.

Apart from penetrating wounds, other types of trauma which may be associated with arterial spasm are the application of a tourniquet (especially dangerous on the arm), fracture of a bone in the neighbourhood of a large vessel, application of plaster-of-paris to a limb, and skeletal traction to the lower leg on a Böhler's frame with the knee flexed. In this method of traction the knee forms the fixed point from which the traction acts, and the popliteal artery may be injured. Cohen gives examples of all these types of injury in which ischæmia resulted in the loss of the limb. He quotes Trueta's experience of the danger of tourniquets in the Spanish war. Towards the end of the war the Spanish surgeons used them only as very temporary expedients. Recognition of the danger of arterial spasm in fractures near large vessels should make the surgeon wary of applying closed plaster in the early stages. It is probable that, with badly contused limbs, it is better to employ the method of slinging in a Thomas splint, with special care not to compress at the flexures. Evidence of impaired circulation will then be obtained in time for the surgeon to operate with success, and plaster can be applied after the first two or three days have elapsed and the danger of ischæmia is over. If ischæmia persists the sequelæ may be: gangrene of the limb necessitating amputation; gas-gangrene infection of the devitalised and deoxygenated tissues, with danger to the patient's life; or Volkmann's ischæmic contracture of the muscles, ending in gross deformity and disability. It is not enough to relieve the cause of the trauma—to remove a plaster or tourniquet or to release traction. The surgeon must bear in mind that the spasm may continue; and if it does he must explore until he finds the spastic artery. He should examine it gently and look for evidence of damage; careful exposure and lavage with warm saline may cause it to dilate but if these measures fail he can try the effect of intravenous injection of papaverine. If there is a localised trauma, such as a hæmatoma, it may be wise to follow the practice of Leriche [5] and excise a few centimetres of the damaged vessel. Leriche was concerned to restore the collateral circulation, his theory being that the reflex, starting in the wall of the main vessel, caused vasoconstriction in the collaterals. This point is not mentioned by Cohen, but it deserves serious attention because the hope of restoring the collateral circulation is almost the only consideration which would persuade a surgeon to undertake such local arteriectomy.

Other methods, short of operation, which have been used successfully in treating ischæmia are paravertebral injections of procaine and spinal anæsthesia. For the upper limb, Cohen suggests that brachial-plexus block anæsthesia is worthy of trial. Papaverine might also be tried without exploration, though it is probably more useful when the exposed vessel remains obstinately contracted. Exploration, to have the best chance of success, must be carried out early—within six hours, in Cohen's opinion. Pain may not be serious; it seems to arise from continued ischæmia of the muscles and not directly in the spastic vessel. In most cases it is as well not to suture the wound. Closure of the damaged tissues may lead to compression, and in any case adds a little to the risk of gas gangrene.

SULPHONAMIDES AND INFANTILE PNEUMONIA

THE mortality from pneumonia in childhood has always been greatest in infancy and the experiences recorded by J. Greengard, W. B. Raycraft and W. G. Motel [6] in the children's division of Cook County Hospital, of the effect of the sulphonamides on this mortality is therefore welcome. In 1937 and 1938, before chemotherapy was used, the fatality-rates were 32% and 31%. The infants, all under 1 year, were drawn from essentially the same group and were treated by the same medical personnel and with the same therapeutic measures other than specific chemotherapy as the 1940 series which is now reported. It was originally planned to give specific chemotherapy to alternate infants but it was found after this procedure had been continued for some months that "the natural human reactions" on the part of house-physicians led to the use of the sulphonamides for the most seriously ill infants. This method was therefore discontinued after half a series of 89 infants had received sulphapyridine, and a group of 200 infants were all treated with this drug. Bacteriological control was effected in every case by taking a laryngeal swab through a Flagg direct laryngoscope. The commonest types of pneumococci were type XIV in 36 cases; type XIX in 31 cases; type VI in 25 cases; and type VII in 18 cases. As soon as a specimen of sputum had been obtained

2. Bigger, J. W. and Nelson, J. H. *J. Path. Bact.* 1941, **53**, 189; see *Lancet*, Nov. 29, 1941, p. 673.
3. Griffiths, D. L. *Brit. J. Surg.* 1940, **28**, 239.
4. Cohen, S. M. *Guy's Hosp. Rep.* 1940–41, **90**, 201.
5. Leriche, R. and Werquin, M. G. *Lancet*, 1940, **2**, 296.
6. *Amer. J. Dis. Child.* 1941, **62**, 730.

sulphapyridine was started. In most cases the drug was given by mouth, though in a few instances when the infant was desperately ill, was vomiting, or was so badly distended that all administration by mouth had to be discontinued, the sodium salt was given intravenously. The daily dosage used was approximately gr. 1½ per lb. body-weight, divided into six doses at 4-hour intervals. As a general rule half the 24 hour dose was given as the initial dose. The drug was given as a powder suspended in water, and the average total dose was gr. 75. The drug was continued as a rule for about 48 hours after the temperature had returned to normal. For the group of 89 infants of whom half received sulphapyridine, it was found that in those treated by chemotherapy the temperature subsided more quickly, reaching normal on an average by the fourth day as compared with the seventh day among the controls. The length of hospital stay, the total duration of illness and the incidence of extension of the pneumonia were all favourably influenced in those treated with sulphapyridine, although this group included the most seriously ill infants. For the larger series of 200 treated infants the fatality-rate was 10%. Thus a reduction to less than a third of what it used to be has been achieved in infants since the introduction of sulphapyridine, and in addition the course of disease has been shortened and the incidence of spread and complications—notably empyema—greatly decreased. Reactions to the drug are less frequent among infants than among adults. Vomiting is remarkably rare considering the ease with which infants vomit, and this means that good-sized doses can be given. Other methods of treatment have naturally not been neglected. The use of oxygen and prompt measures to deal with abdominal distension (parenteral fluids, rectal tube and continuous gastric aspiration) have been employed as hitherto. Specific antipneumococcal serum has been used in some instances when indicated by typing. No exactly comparable series has been published in the British Isles but it is noteworthy that the fatality-rate from bronchopneumonia reported [7] by C. J. McSweeney of Dublin was reduced in the under-5 group from 30% in 1938 to 10% in 1939, the first sulphapyridine year—the same figure as was achieved in Chicago.

NIGHT-BLINDNESS

THE Finns are now said to be getting very short of food, and for some time the authorities there have been anxious about the shortage of sources of vitamin A and carotene. The other Scandinavian countries, and no doubt the Finns as well, are normally large consumers of dairy produce and eat few vegetables, so that they rely almost entirely on animal fats for their vitamin A. Nylund [8] made a study of night-blindness in Finland in October and November, 1940, with a view to determining whether there had been any increase in vitamin-A deficiency since the war began. He compared his findings in 31 students with those in 82 students examined two years earlier. Of the 82 seen in 1938, 79% showed normal adaptation, 9% were night-blind and 12% were borderline; in the 1940 group, only 48% had normal adaptation, 29% were night-blind and 23% borderline. He also compared his findings in 40 pregnant and nursing women (in whom the vitamin-A requirements are known to be high) with those in a similar series tested in 1938. Here again there was a falling off in dark-adaptation—from normal adaptation in 95% and night-blindness in 5% the standard had fallen by 1940 to normal adaptation in 65% and night-blindness in 25%, with 10% on the borderline. Rationing of dairy products began two months before the 1940 tests were made, the daily amounts allowed being: butter 25 g. (⅞ oz.), cream containing 10% fat 50 g. (1¾ oz.) and milk 200 g. (7 oz.). The average daily diet at that time was estimated as containing liver 3 g. (⅒ oz.), meat 150 g. (5¼ oz.), carrots and other vegetables 5 g. (⅛ oz.). On this basis the average daily intake was assessed at 1055–1280 I.U. of vitamin A, plus 455–1585 μg. of carotene. This was certainly insufficient, and Nylund urged an increased consumption of carrots, beans and spinach, with extra liver once a week. Pregnant and nursing women had been allowed larger rations, receiving daily 40 g. (1⅜ oz.) of butter, 50 g. (1¾ oz.) of cream and 600 g. (21 oz.) of milk. Their average daily diet thus contained 1870–2230 I.U. of vitamin A and 750–1960 μg. of carotene. Night-blindness did not develop on this diet and it was found that dark-adaptation was fully normal if a minimum of 2000 I.U. of the vitamin was supplied daily.

Other workers have put vitamin-A requirements higher, and it is usual now to express these in terms of body-weight. A distinction must be made also between the optimum daily intake and the minimum required to prevent dietary night-blindness in otherwise normal people. Thus for an adult man the optimum is considered by Booher [9] to be 40–60 I.U. per kg. body-weight daily, or 3000–4000 I.U. for a man of 150 lb.; the minimum protective intake for a man is 20–30 I.U. per kg. daily, or 1500–2000 I.U. More accurate work is required, however, before any definite figure can be universally accepted. The vitamin-A needs of the newborn child are thought to be covered by the vitamin-A content of colostrum and breast milk, provided the intake of the mother is adequate. The most reliable estimate of the daily requirement of pregnant and lactating women is 5000–6000 I.U.

Two retinal mechanisms are concerned in dark-adaptation. During the first 7 minutes the photopic mechanism of the cones is engaged. Subsequently the scotopic adaptation of the rods comes into play and continues slowly for several hours. More than 95% of dark-adaptation, however, is complete after 30–40 min. in darkness. Vitamin A is an essential constituent of visual purple, which is found only in the rods, but it appears also to be essential for the complete dark-adaptation of the cones. In many cases of experimentally induced night-blindness impairment of dark-adaptation begins on the first day of the vitamin-A-deficient diet and may be significant within a week. In these cases it has often been shown that vitamin-A brings about a rapid improvement, followed by a more gradual process of complete recovery, so that normal dark-adaptation may take longer to regain than to lose. It has been suggested that recovery may be hastened by adding riboflavin and ascorbic acid to the diet, in addition to a supplement of vitamin A. To obtain the most prompt and complete recovery, massive doses (100,000–300,000 I.U. daily) have been recommended by some workers; others have obtained the same result with doses as low as 10,000 I.U.

Mr. PERCY FLEMMING, consulting ophthalmic surgeon to University College Hospital, died at his home at Upper Basildon, on Dec. 19, at the age of 78.

AN editorial board has been set up under the chairmanship of the President of the Board of Education to direct the compilation of a medical history of the war. The Fighting Services, the Ministry of Health, the Department of Health for Scotland, the Medical Research Council and the War Cabinet secretariat will be represented, and Sir ARTHUR MACNALTY has been appointed editor-in-chief.

7. *Lancet*, 1940, **2**, 3.
8. Nylund, C. E. *Nord. Med.* March 1, 1941, p. 659.
9. Booher, L. E. *J. Amer. med. Ass.* 1938, **110**, 1920.

MEDICAL HONOURS.—The military cross has been awarded to Captain Leonard Bapty, M.B. Aberd., R.A.M.C., and the R.N.V.R. officers decoration to Surgeon Commander D. C. Wilson, F.R.C.P.E.

Special Articles

FUTURE OF MEDICAL RESEARCH

W. W. WALTHER, M.B. LOND.
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THERE is some justification for saying that we are living in the Golden Age of Medicine, for at no previous time have there been so many advances in such a short space. For example, the sulphonamide group of drugs alone have revolutionised the treatment of many common conditions. And yet there is still much room for improvement in the organisation which makes these discoveries possible. Research does not consist simply of working out and publishing the results of an original idea. Much time must be spent in reading through the literature of work already done on the subject, a task which may involve one in many strange languages, only to find, perhaps at the end of many weeks of labour, that somebody else has already worked out the same problem but has somehow failed to get immediate recognition.

In spite of the enormous volume of research which is published little of it ever finds its way into general use, partly because much of it remains unverified and partly because it is simply not noticed. This does not sound at all like a golden age, but the statement is easily supported by facts. For example, the original suggestion (based on sound observation) that the shock of burns should be treated by transfusion with a protein-containing fluid was made in the middle of last century. Yet this very practical suggestion was overlooked and only rediscovered during the last few years. Presumably nobody noticed it and it therefore failed to get verified. On the other hand, some discoveries seem so much to catch the researcher's fancy that a vast and unnecessary amount of redundant work is wasted on one particular subject. An example of this is the spate of literature which followed the first few papers about prontosil and allied drugs. It has been estimated that the number of papers published on this subject is in the region of ten thousand. Now even the most confirmed sceptic would hardly demand such a vast literature to convince him, and many of these papers are based on such a small number of cases that by themselves they would be of little significance. And yet, until an enormous amount of work on any particular subject gets published, the general practitioner does not hear about it unless it concerns some material whose advertisements are pushed under his nose. This is because the busy doctor has little time to wade through (or income to pay for) all of the large number of medical journals which are published today. But there are plenty of would-be contributors to these journals, largely owing to the fact that besides the quest for knowledge and the desire to benefit humanity there is a need to attain personal recognition. A few publications are a great recommendation for a job, with the result that, as Miller [1] says, "We find it necessary to digest an ever-increasing number of half-baked adventures in medical research." Often enough, in the haste occasioned by the desire to be first in the field, the work is scamped. Sometimes this may also be due to lack of facilities to carry out some important detail of the work. General practitioners have few facilities for accurate work or for producing a number of results sufficient to be statistically significant. In this way a large potential army of keen men is immediately robbed of its keenness. Or, if an effort is made, it lacks numerical weight. Yet under skilled guidance individual efforts can often be turned to good account. There is no dearth of subjects for research, but we lack an organisation which can apportion the work to the best advantage. Although many people no doubt prefer to choose their own subject, it is probable that under a competent authority most would be prepared to work at some set problem either singly or as members of a team.

Many believe that research is insufficiently endowed, and point out that the money available is usually only sufficient to support a newly qualified man, without domestic commitments, on a whole-time basis. Now, there is no special virtue in whole-time research work, though one may be forced to devote one's whole time to it in order to do one's own reading. Neither is it certain that the newly qualified man, however keen, is the best type for research. Admittedly, the ideas are often supplied by the head of a department while the actual work is carried out by assistants, but this does not cover and should not cover the whole field of research.

The criticism of modern research thus falls under three heads—inadequate endowment, lack of organisation, and a failure to get results embodied in practice in a reasonable space of time. It is unlikely that the private endowment of research will increase in the future, and the best way out of the difficulty seems to be the development of a part-time arrangement whereby anybody being paid by the state (and the number now is greater than ever before, and likely to be greater still) should be allowed sufficient spare time to do research if the facilities exist for it. In certain circumstances a definite prize might be offered for the solving of some particular problem. The prize of £10,000 offered by a daily newspaper encouraged research into television, with the result that, before the war, England led the world in this field, and has since led it again in radiolocation.

A CENTRAL BUREAU

For the proper organisation of research some responsible controlling body would have to be set up. This body would be equipped with an adequate library and a permanent staff whose duties would include the preparation of abstracts of all that is known on particular subjects in any language, so that the intending researcher is saved the trouble of reading a vast amount of literature in order perhaps to clear up one small point. In addition they should be capable of giving up-to-the-minute information on any medical subject to any medical practitioner who asks for it, day or night. This looks a formidable task, but, with an efficient card-index and cross-referencing system, a trained staff would soon find no difficulty in giving rapid answers to questions. The cost of maintaining such a library would be great, but it would be well worth it. H. G. Wells, in his "Shape of Things to Come" had such a scheme for the card-indexing of all knowledge—the "Memory of Mankind," with headquarters in Barcelona. All research work, both current and projected, would have to be registered with the bureau, which would then be able to prevent anyone from engaging on redundant work. It could also apportion the work to the best advantage, and organise the appropriate team for the rapid solution of special problems and for the verification of important observations in the shortest possible time. Another important function would be the organisation of teams of general practitioners, with the use of laboratory facilities, to carry out research on minor ailments which do not usually find their way to hospital beds. All this could only be done by an official body with wide powers which enjoyed the confidence of the whole medical profession. Such a body should, of course, be organised internationally, like the International Labour Office at Geneva, but as the post-war future is impossible to foresee a start should be made here. The tendencies of foreign research should be watched and all allied and friendly neutral countries asked to participate in an exchange of medical knowledge.

The results obtained would be examined for contradictions which could be dealt with immediately by repetition; they would then be submitted to statistical analysis and finally written up in collaboration with an editorial staff whose job it would be to compress the material into as small a space as would be consistent with clarity. An accurate abstract would be prepared at the same time. Important results might well be published in full in a separate international journal of research simultaneously produced in those countries which participated, and the abstracts would appear in the regular journals.

The rapid dissemination of results important to practitioners would be the last and most important duty of the bureau. As has already been pointed out, owing to the multiplicity of journals, results may never reach the people who would most benefit by them. To correct this results embodying new methods might be circularised to practitioners in the form of a loose-leaf supplement to a standard textbook, the production of which would be one of the first jobs of the editorial and library com-

1. Miller, N. F. *J. Amer. med. Ass.* 1941, **117**, 905.

mittee. We might then at last get a textbook which was readable, and it could be kept constantly up to date by replacing obsolete information with new leaves. This textbook—or rather the series of them to cover all the special subjects—should be sent free to all members of the medical profession including students, and the supplements would also be free. Though this would be an added burden on the public purse it would be in a good cause. An organisation for disseminating information on the latest methods of treating air-raid casualties already exists. The E.M.S. sends round circulars on official methods of treatment and is even collecting information on some subjects. An extension of this principle to the whole of medical practice could hardly be thought objectionable.

* * *

Let us then demand facilities for the proper organisation of research, for assuring the research worker a reasonable living, for leading him to the problems which most urgently require solution, for preventing him from engaging on redundant work, for providing him with an adequate résumé of all that is known about his chosen subject, and, most important of all, for getting the knowledge as quickly as possible to those whose job it is to use it. We need an organisation which, as H. G. Wells puts it, "accumulates, sorts, keeps in order and renders available everything that is known."

PALESTINE

MORTALITY AND SICKNESS AMONG INFANTS

THE infant mortality in the past ten years has been analysed in the July issue of *Hadassah*, the bulletin of the Jerusalem University Hospital. The deaths have been grouped according to the various races found in Palestine, and it is encouraging to find that the rate has fallen in all sections of the community. Thus over the period 1931–40 the rate has fallen from 186 per 1000 to 147 among Arabs, from 133 to 107 among Christians, and from 81 to 59 among Jews. The infant death-rate is highest between April and September, the Palestinian summer months. Among Arab infants the summer rate is double that in winter, and among Jews half as much again as the winter rate. The commonest recorded causes of death are congenital debility, diarrhœa and enteritis, and bronchopneumonia. Bograchow, of the children's department at Tel Aviv, in an account of his experience with infantile diarrhœa during 1938–40, says that on the whole the disease affects older infants in Palestine than it does in Europe because almost all Jewish mothers breast-feed their infants, who are thus safeguarded against infection carried by cow's or goat's milk. Nevertheless the social status of the family and the nutrition of the infant are important in ætiology and prognosis. Thus infantile diarrhœa is very common among the poorer Jewish families. Nutritional disorders are also common, and often associated with qualitative or quantitative hunger. He mentions a toxic form of infantile dysentery with a fatality of 100%.

POISONOUS BITES AND STINGS

J. Seide of Jerusalem, writing in *Harefuah*, reviews the poisonous fauna of Palestine. These include the jelly fish, *Rhizostoma pulmo* and *Aurelio aurita*, and the sea anemone, stings from which give rise to toxic skin eruptions. The bite of the centipede *Scolopendra cingulata* causes pain and swelling but is otherwise harmless. Spiders of the genus *latrodectus* are highly poisonous and a sting from one may endanger life in a child. *Tarantula albofasciata* is less poisonous. There are six different species of scorpion in Palestine, all of them poisonous. The commonest is the yellow *Buthus quinquestriatus*, which gives an extremely painful sting causing local inflammation and sometimes constitutional disturbance, though Seide had never seen a death from such a sting. Bees, wasps and hornets sting like their kin elsewhere, and bites from ants are negligible. Several species of poisonous fish cause trouble to fishermen, including species of scorpæna and trachinus. The venomous snakes found are mostly vipers, the oriental form of the Levant viper being the most common in inhabited parts of the country; its bite may cause death, and prognosis depends chiefly on the promptness with which antitoxin can be given. Of 23 cases treated in hospital 3 were fatal. Bites from *Vipera lebetina* are discussed more fully by Lefkovitz in a separate paper. These are becoming commonest during the hotter months. The victim develops local and general signs, among which circulatory disturbances are prominent; indeed vasomotor instability often persists for years after the bite. At the time of the injury œdema and hæmorrhages are common. Experiments on frogs suggest that the toxin attacks the vascular endothelium, causing progressive engorgement of the peripheral vessels; the condition spreads from the region of the bite. The patient develops hypotension, low temperature and myocardial failure with collapse, and may die from circulatory failure. Treatment at present recommended is ligation of the affected limb and injection of serum.

PRECAUTIONS AGAINST MALARIA

Malaria is increasing in some of the northern districts. The health department of the Jewish agency and the university appointed a committee of inquiry under the chairmanship of Professor Mar, which reported some months ago (*Hadassah*, March, 1941). The committee advised that the tents and huts of the colonists should be provided with mosquito-nets, and that specially constructed doors should be supplied to the huts. These recommendations are being carried out and the colonists are being instructed in keeping their irrigation canals clean and free from plants so as to discourage the breeding of the larvæ.

MILK FOR INVALIDS

UNDER the Ministry of Food's milk-supply scheme priority-supplies of liquid milk are allowed to certain invalids against a certificate given by a medical practitioner. The conditions qualifying for these special supplies are now specified in a list, drawn up by the ministry's medical advisers and made public on Dec. 11, as follows:

- Active tuberculosis of all types;
- Silicosis;
- Affection of the mouth, throat or gullet or organic nervous disorder causing interference with swallowing;
- Gastric, duodenal or anastomotic ulcer;
- Illness characterised by high and prolonged fever;
- Post-operative conditions after major operations;
- Active workers, including domestic workers, during an illness which temporarily incapacitates them for work;
- Sick children not attending school;
- Dyspepsia due to conditions other than ulceration of the stomach or duodenum;
- Colitis; Diabetes mellitus;
- Thyrotoxicosis; Nephritis;
- Hyperemesis gravidarum; chorea of pregnancy; acute yellow atrophy occurring during pregnancy; albuminuria of pregnancy; eclampsia; which are of sufficient severity to entail total confinement to bed.

These diseases and illnesses are the only conditions for which special supplies of milk to invalids may be authorised by a medical practitioner. The quantity of milk allowed is at the discretion of the doctor, subject to a scale prescribed by the Ministry of Food.

FOUR observations in Dr. A. T. W. Powell's school report for WALTHAMSTOW call for comment: decline in corneal ulcer; decline in organic heart disease; decline in chronic otitis media; and increase in dental caries. These changes are common throughout the country. In 22,847 inspections and reinspections only one case of corneal ulcer was detected, yet formerly this disease was often found in school-children. It increased in incidence in the last war, but since then it has decreased almost to vanishing point, probably because of improved nutrition. The decline in chronic otitis is mostly due to greater attention to the treatment of the acute phase of the disease, but also in part to the lowered severity of scarlet fever and measles. The decline in heart disease and child rheumatism, which is noticed in all units with rheumatism clinics, is none the less welcome because its causes are obscure. The increase in dental caries, especially in infants, may be due to greater attention, but most dentists believe it to be genuine.

In England Now

A Running Commentary by Peripatetic Correspondents

THE little I know about Japanese mental processes, so different from ours, inclines me to believe that their communiques will be even less reliable as a source of news, but more indicative as to intentions, than the German ones. The Hun mind starts off with the raw material, truth; halves it, doubles it, twists it, or suppresses it according to need, but at any rate starts with it as a basis, a relic of a code of morals that bound and helped to evolve the European world. The Jap uses truth like steam, to be harnessed to man's use, if required; to be replaced by pure invention, like some of those landings, if a trap demands. My mind goes back to a time when I nosed about on the outskirts of their ports, Nagasaki, Yokohama, Kobe; got the same feeling as I do with dogs and birds at home—that here are minds working in different ways to mine—and played at putting myself in their place. I remember the points where I seemed to come in contact with them: the "soil sense" and my sympathy with the jinrikisha man who hoarded his daily urine in a tin to bring back to his little terraced garden; their sense of beauty, the single flower with a background, which seemed to me to be a reflection of the stamped beauty of the inland sea; the infinite patience and delight of the growers of dwarfed trees; the public hot baths and their sensual skin pleasure of cleanliness; the small boat men, their love of the sea and the tides, and their fear of it. Those seemed to be the tiny points of contact; far away I sensed a religious nationalism which was as foreign to me as our moral system with its emphasis on sex is to them. There is a certain satanic humour in the facts that in this war with Japan—a real war between sub-species—she should be allied to those who make a fairy story of race purity and world domination, and fighting against those whose industrialism has been at the same time the source of her strength and her poison.

* * *

As a relief from the world war Mr. A. P. Herbert's word warriors will find a happy hunting ground in the recent B.M.A. report on Industrial Health in Factories. A few points can even be scored off the title itself because health, unlike peace, is apparently divisible, the implication being that in addition to "industrial" health, other types of health are to be found in factories. The word "industrial" keeps cropping up like King Charles's head. Thus "an industrial medical officer is appointed to a factory"; it is not possible to appoint a doctor to a factory, he must be an "industrial medical officer" even before he has had any experience of factory life. Again, a new specialty called "traumatology" is to be fostered and attention is called to the scarcity of trained "traumatologists" in the country. It appears that the ordinary doctor has had no training in treating injuries. In due course we shall undoubtedly get subdivisions of the new specialty, such as cephalotraumatologists, thoracotraumatologists and even digitotraumatologists. One can already visualise the necessity for a new society to be called the Association of Philotraumatologists. Then there is a crying need for doctors constantly to attend postgraduate lectures (for after all there is nothing like a continual state of postgraduateness for keeping doctors out of mischief) so that they may understand more fully the fact—as yet imperfectly recognised—that when somebody is whacked with a rubber truncheon a solution of continuity might arise anywhere in that body's body, depending on the part whacked and the nature of the earth's crust on to which the whackee might fall. No-one but a skilled traumatologist of some years' experience in Birmingham would be entitled to repair the breach. A mobile air-borne team of traumatologists should be kept champing on the air-screw so that they might dash off to Land's End or John o' Groats at the slightest provocation, and particular care must obviously be taken to include in the team relays of digitotraumatologists because cut fingers are so common, don't you know! Wounds will no longer be sewn up with surgical needles and catgut or silk, but with traumatological aiguilles and tautological byssofils.

* * *

I'm imprisoned hopelessly, deep down in a dungeon; how did the old saw go? "Down in a deep dark ditch lay an old cow. . . " No, that doesn't seem to fit, but anyway it's deep and it's dark, and there seems to be no escape; my tongue is swollen, I can't even whisper, let alone shout for help. How can I get at that man who keeps yelling in my ear, "Come on, Sir, come on"? Suddenly the shouting swells to a terrific volume of sound very close to my ear. I seem to be climbing through the roof, but the prison suddenly resolves into the reality that my blankets have got twisted round me, I'm thirsty, and the camp bed is too small for an expansive sort of nightmare. "Oh, all right George, I can hear you now; yes, I'll get up; yes, thank you George, I know the tea's cold; I never hear when you call me first . . . what's that, only five more minutes? O.K., George, I'm up now, you needn't worry any more."

My batman and I have, between us, accomplished our most difficult job in the day—getting me out of bed. I always intend to have half an hour at least for washing and dressing, but as often as not it ends by being concertina-ed into five minutes. With the mists of sleep still clinging to my eyes I stumble into breakfast; usually a solitary meal (the M.O. always has to get up before anybody else), but this morning I find another man, the new M.O. replete with breakfast, impatient to be off. "Well, Durrant, I see you've taken to heart the tip I gave you last night about getting up early enough to eat a decent breakfast." "Don't worry, there's still some food left." I switch on the wireless, explaining that as soon as the announcer has mentioned how many raiders were over England during the night it is time for me to get going. I can tell from the look on Durrant's face that I am wasting my breath, and that he will always be on his way long before the announcer gets near the microphone. But I persist manfully in giving him all the petty details of the daily task, helping him metaphorically over many stiles that seemed difficult to me at first because, as I tell him, I was the first doctor appointed to do regular rounds of this chain of forts.

Crossing the parade ground we glance back at the windows, now beginning to fill as the shavers thrust their white-lathered faces out for that first breath of morning air, and I tell Durrant about a photograph that I look forward to procuring from the Nazis when we've beaten them. Three mornings in succession, at the same time, they came over and snapped me just as I was crossing the parade ground. I should like to know what I look like from 30,000 feet. Barely controlling his self-righteousness at noting that the sun is not yet above the housetops, Durrant is a little abashed when I point out that nearly all the essential services of life have already finished their morning round: the postman has been, the baker has gone, we had fresh milk with our breakfast, the newspapers only just miss us. "And anyway," I remind him, "this is nothing to the winter; why it's pitch-dark then when you set out to catch the boat."

Every morning (although I never have time to stop to do it) I almost catch my breath as I burst through the mouth of a little alley, on to a pathway in full sight of the sea. The path trots down some steps and joins a road to curve round a tiny bay, leading us along to a small pier where the boat waits each morning. It takes five minutes to walk round that little bay, never dull ones; there has always been the excitement of trying to get to the boat in time, as well as the exciting beauty of that inlet, with the harbour on the far side of the breakwater an ever-changing pool of ships and far away the open sea. There have been still, frozen winter mornings when the "bowl of night" has lingered mirrored in the waters; mornings when the sun has only winked a solemn eye above the horizon's edge, disliked the prospect, and sought slumber again under black blankets of cloud; mornings when the sun has pointed a fiery finger across the flat grey sea, touching one with warmth and beckoning the soul to infinite distance. ("Be careful down these steps, they're very slippery in winter . . .") Mornings when there was rain, biting in winter, flooding in spring, splashing in summer, or just a film of damp, uncomfortable mist. ("Buy an oilskin; it doesn't look very military, and it won't get you a salute from an A.B., but it's worth more than you pay for it. No, I'm afraid mine isn't for sale.") Days when the clouds are soft creamy pillars of down, jagged snow-capped peaks on grey mountains, or growling, muttering, crackling blackness shooting tongues of livid fire across the sky. ("No,

I don't know, officially, what they make in that building, but they always start up that motor with its funny little phut-phut-phut exhaust just as I come round this corner. . . . Yes, Jerry did have a crack at it one day, but he hit the sea and bent those rocks a bit. They usually hit the sea round these parts.")

Now for the final straight, the skipper has sighted us and is starting up the engine as a hint that we should make some show of running because, of course, I am just a minute late—it always ends that way. At first the skipper didn't take to me at all kindly, said he was dashed if he'd wait for me or any other dashed doctor. But somehow he always does wait. ("Look at those pink flowers, I don't know what they're called, but you'll find an amazing variety of flowers leading a fairly comfortable existence among the crevices of the rocks, even down to the water's edge. I can't imagine how they do it, because this breakwater is fiendish in all winter weather, often in spring, sometimes in summer, and it can be deadly in autumn. Only a week ago it was so rough that not a single boat could put off—the wind whistles through the telegraph wires, flings the sea across the breakwater, roars into one's eardrums, freezing them to agonising deafness, and threatens all the time to dash one on to the rocks below.")

"Good morning, skipper." "Mornin' Sir, let 'er go, Dick." We take shelter in the wheel house. "What's this I hear about a new doctor, Sir? terrible it is; why we only just get to know one when they sends us another. But there, perhaps he'll get up betimes in the morning, then I shan't be so behindhand with my work all day." It is a pity that the skipper will no longer be able to start his working day with this masterly exaggeration.

To any Englishman this twenty-minute journey across the enormous harbour would be fascinating; to a man used to reaching his daily work by bus, tram or tube it is a holiday. Today, it is true, the harbour is almost empty, but one day the traveller will see H.M.S. ....., well he will see various units of the Royal Navy, he will see merchantmen of all shapes and sizes and nationalities, trawlers and drifters, seaplanes, prizes that once flew the swastika or were built in Genoa or Naples, and he will notice many other things that are best left unwritten. ("No, I've never disgraced myself on this boat, though there are occasions when it is hard work for two men to swing the wheel and hold it, especially outside the boom in one of these sou'westers that blow up so suddenly hereabouts. And I could tell you a story about the sergeant-major of the Battery that we are about to visit, but perhaps it would be fairer to let you wait for that one until, in a sudden confidence, he tells you the sorry tale himself.") The fort, from being a rounded blob in the early-morning haze, now begins to take shape and to stand out black and defiant against the horizon. Seagulls wheel and circle, alight and take wing in a continuous poem of movement; their skirling pierces the sea-born silence. "Well, here we are; good-bye, skipper, I shan't be seeing you again, because we'll return in the *Ladybird*." "Mornin', Sir, best of luck to you."

The party waiting to go ashore for day leave always present something of a problem. It is not easy to make a correct and dignified return to their grinning salutes when one is concentrating on a perilous scramble up a slippery ladder. And now for our second breakfast. "Hello, doc, are you back again already? Oh, well, it's your last day, thank heavens, so I suppose we must be grateful for small mercies!" I wonder how long it will be before they have such a cheerful greeting for my successor, now being treated with meticulous politeness. A matter of a few days only, I expect; the traditional reserve of the Englishman is soon dissolved in these friendly surroundings. As we leave the main door of the fort after our cups of tea I automatically clutch at my cap. There is always a breeze lurking round the corner waiting to toss one's headgear to the waiting waves. After it had twice caught me out, and I had proved that the cap, S.D., does not stand up to immersion in seawater, I resolved it would never happen again, or if it did that at least it would not cost me so dear. I have learned to appreciate the troops' "fore-and-aft."

* * *

Great work has been done by the Ministry of Health in the provision of amenities at rest centres where homeless people may be drafted after a severe raiding incident. Arrangements are made for the primary comforts of shelter, a cup of hot tea, blankets to encourage sleep, food for the hungry, and medical and nursing care for the sick. Loyal workers of all kinds have been earmarked—W.V.S., school nurses, health visitors, district nurses, Civil Nursing Reserve, public-assistance officers, public-health medical officers, and so on. The storage cupboards at the centres are a feast for rationed eyes, with their shelves of tinned and bottled goodies that have long since departed from the shop window. One thinks of the dark cloud and its silver lining and turns sadly away with the sublinguals working at top pressure. Going round some of the centres recently it struck me how much was being attended to in the material sense, how little in the spiritual. If, I thought, we are compounded of body and soul, where does the soul side come in during the drab hours? Of course there are the encouraging word, the cheery smile, the friendly pat on the shoulder. But these things are individual and do not necessarily affect the mass; and the morale of the mass is on all counts very important. In addition to all the voluntary helpers the ministry should see that a gleeful soul with a piano-accordion is on the centre staff—one who can play "Roll Out the Barrel" and sing "Begone, Dull Care." As musician he might be, more than any other, entitled to wear the mystic letters "A.R.P."

Parliament

QUESTION TIME

Students and National Service

Mr. E. BEVIN, minister of labour and national service, informed Sir ERNEST GRAHAM-LITTLE that the lowering of the age of call-up to include men born in 1923 would not affect the arrangements made for students following specified scientific or technical courses. Other male students at the universities who were in the 1923 age-class might apply to the university joint recruiting boards and if they received a favourable recommendation they might after enlistment into one of the fighting services be placed to the reserve and, subject to the exigencies of the service, complete one year at the university while receiving training in the senior training corps or the air training squadron. These arrangements would not extend to students who had already completed three terms at the university. At present it was not intended to call up women under the age of 20. The arrangements for women students over 20 were being considered.

Central Medical War Committee

In answer to a question Mr. E. BROWN, the minister of health, stated that the services committee, which the Central Medical War Committee has authorised to deal with questions affecting the recruitment of individual medical practitioners to H.M. Forces and other cognate matters, has met 17 times in the 12 months ended Nov. 30 last. The attendances were as follows:

Members	Attendances Actual	Possible
*Sir Alfred Webb-Johnson	9	12
Sir Girling Ball	15	17
Dr. J. A. Brown	11	12
Dr. A. E. Clark-Kennedy	—	5
Dr. H. Guy Dain	—	5
Dr. R. O. Eades	11	12
Sir Francis Fremantle	15	17
Dr. F. Gray	12	12
Dr. D. G. Greenfield	6	17
Dr. E. A. Gregg	11	17
Dr. G. Lilico	16	17
Dr. Peter Macdonald	15	17
Dr. J. C. Matthews	13	13
Dr. C. Newman	8	12
Prof. R. M. F. Picken	12	17
Col. A. H. Proctor	12	17
Prof. W. Fletcher Shaw	—	5
Mr. H. S. Souttar	12	17
Sir Charles Wilson	2	5
Dr. S. A. Winstanley	7	12

* Chairman until succeeded by Sir Girling Ball.

Observers	Attendance Actual	Possible
Admiralty	10	17
War Office	10	17
Air Ministry	9	17
Ministry of Health	17	17
Ministry of Pensions	10	10

Industrial Health Research Board

Replying to Mr. F. MESSER, Sir JOHN ANDERSON, the lord president of the council, said: The Secretary of the Industrial Health Research Board is Sir David Munro, who is sixty-three years of age. He is at present giving part of his time to the Ministry of Supply as chief medical adviser, but in view of that a senior member of the board's investigating staff

is acting as joint secretary. There are thirteen full-time investigators (none medically qualified) whose names and qualifications are as follows: T. Bedford, D.SC., E. G. Chambers, M.A., F. A. Chrenko, W. M. Dawson, B.SC., E. Farmer, M.A., Miss Alice Heim, PH.D., D. E. R. Hughes, B.SC., R. Marriott, B.SC., Miss May Smith, D.SC., F. G. L. Stock, C. G. Warner, PH.D., H. C. Weston, M.I.I.E., and S. Wyatt, D.SC.

Mr. MESSER: Does the Minister not think that this important post ought to be a full-time job, especially as it was so during the last war?—Sir J. ANDERSON: Normally it is a full-time job, but Sir David Munro is giving much needed help in the ministry of supply, and so far as his time is not available to the board, the gap is filled by the temporary appointment of a senior member of the staff.—Mr. MESSER: Is the Minister aware of the grave dismay with which the public have received the report of the British Medical Association that not less than 32,000,000 weeks are lost each year by industrial workers through preventable illness?—Sir J. ANDERSON: The business of the board is not primarily concerned with industrial disease, but with such matters as industrial fatigue, and the like.

Medical Practitioners as Combatants

Sir ERNEST GRAHAM-LITTLE asked the Minister of Labour how many registered medical practitioners were at present serving as combatants in any of the fighting services; and whether, in view of the shortage of medical personnel for both civilian and military needs, he would allocate such practitioners to medical duties.—Mr. BROWN replied: Arrangements have been made to secure that normally a registered medical practitioner may serve in H.M. Forces in a medical capacity only and although I cannot give a precise figure I have reason to believe that the number serving as combatants is negligible. The matter referred to in the last part of the question appears to be for the Service ministers who agree that it is only in exceptional circumstances that a medical practitioner may be employed in a non-medical capacity.

Soldiers in Medical Category C

Captain H. D. R. MARGESSON, secretary of state for war, replying to Mr. F. J. BELLENGER said that many soldiers of medical category C were at present performing useful service in the Army by freeing men of higher categories for more active duties, and in view of the present man-power situation he could not agree to their automatic discharge. Where application was made for the release of an individual for work of national importance the soldier's medical category was taken into account.

Hospital Staffs

Major G. OWEN asked the Minister of Labour whether, in view of the shortage of nurses and domestic staffs in hospital, he is prepared to recognise such service as a form of national service.—Mr. G. TOMLINSON replied: I recognise service on the nursing and domestic staffs of hospitals as one of the most important forms of national service. It is included in the short list of vital war work for women for which women registered under the Registration for Employment Order are required.—Major OWEN: Is Mr. Tomlinson aware that many hospitals are short of domestic staff? Is it not a corollary of this order that the Minister will now be able to direct women with experience of domestic service to these hospitals, as he is able to do into the Armed Forces?—Mr. TOMLINSON: I should require notice of that question.—Sir JOSEPH LAMB: Is Mr. Tomlinson aware that the women who are being sent now are daily workers, who arrive at 8 o'clock and leave at 5; consequently there is no one to take charge of the early or late work?—Mr. TOMLINSON: Hospitals, like all other institutions and industrial organisations, are having to do the best they can with the material available.—Sir J. LAMB: With the best will in the world, how can they wait till 8 o'clock to give all the patients their breakfast?—Major OWEN: Is Mr. Tomlinson aware that there are institutions of this character which have no cook at all? The matron of one hospital, to my own knowledge, on Sunday last had not only to look after the dressing of the patients, but to cook dinners for 14 people.—Mr. MESSER: Before the department considers compelling anyone to work at a hospital, will Mr. Tomlinson do his best to see that the remuneration of the lower-paid staff is improved?—Mr. TOMLINSON: I will consider all the suggestions that have been made.

Detained Persons and Insurance Benefits

Miss F. HORSBRUGH informed Mr. DAVID ADAMS that regulations would shortly be made under powers conferred by section 8 of the National Health Insurance Act 1941 by which persons detained under Regulation 18B who before detention were entitled to N.H.I. benefits would be given an opportunity to safeguard their health insurance and contributory pension rights by paying within a reasonable period after their release contributions at a reduced rate for the period of their detention. The reduced rate of contribution payable in these circumstances made due allowance for the fact that such persons were not in a position to obtain health-insurance benefits during their detention. Replying to a further question, Miss HORSBRUGH said that there would be a lapse of time after these people were released before they fell into arrear in respect of contributions.

Letters to the Editor

PSYCHIATRISTS AND THE RECRUIT

SIR,—I have been much impressed recently by the number of patients one sees who are invalided out of the Forces on account of mental illness. This is obviously uneconomic and wasteful in two respects. These men and women have to be equipped and trained and presumably cost the country a considerable amount of money for short and unsatisfactory terms of service, as well as taking up hospital time and accommodation before discharge. In addition many of them are people who, while they have a precarious adjustment to life, have done and could do useful work in civilian life, if their mental equilibrium were not disturbed by the need to adjust to unfamiliar and distasteful conditions, to say nothing of combatant service. We are told that these conditions are caused by an insufficient number of psychiatrists to advise recruiting boards, and to treat early and slight anxiety cases in the Forces. Much of the time available for treatment must necessarily be taken up in diagnosis and disposal of so much unsuitable material. Is it not time that the available psychiatric personnel of the country were more thoroughly mobilised? There are still many qualified and experienced women psychiatrists upon whose services no national call has been made, and the institutions for the chronic mentally sick boast many highly qualified and experienced psychiatrists whose work hardly, in this national emergency, makes the demand upon them which they would probably welcome.

Harley Street, W.1. MARION GREAVES.

FRACTURED FEMORAL NECK

SIR,—The outlook expressed by Mr. Cochrane on the plaster treatment of fractures of the neck of the femur must seem to some surgeons retrogressive. Surely the greatest gain that pin fixation of these fractures has brought is the diminution of the mortality-rate due to hypostatic pneumonia. A patient whose fractured femoral neck has been pinned can straightway sit up and do breathing exercises, and in a few weeks he can be up and out on crutches—instead of spending three months in bed between sandbags or splints, or having his chest and abdominal muscles badly hampered by a Whitman type of plaster spica.

Mr. Cochrane's note that in spite of considerable experience of these fractures he has not had a case of aseptic avascular necrosis needs some further explanation. He states that many of his cases became arthritic, and one would have thought that if the X rays of some of his arthritic cases had been examined at the critical period of 6–8 weeks after the fracture they would have shown death of the head. Failure to spot avascular necrosis at this stage, as pointed out by Watson Jones here and by Phemister in Chicago, usually results in an arthritis. They considered that unless the head of the femur is protected, during this stage of revascularisation, from the traumata of movement or the compression of weight-bearing, distortion and exfoliation of cartilage leading to arthritis must result. As Watson Jones points out in his book, fixation by pinning secures apposition with firm fixation of the fracture line and this, coupled with an absence of weight-bearing, is essential if the head is to be revascularised. May not the torsional strain, which must fall on the fracture callus when Mr. Cochrane allows early movement of the knee out of his plaster spicas, be responsible for some unrecognised cases of avascular necrosis? And these cases, though union by bone is possible, usually end up as arthritics unless they are carefully treated.

National Temperance Hospital, N.W.1. G. O. TIPPETT.

HOSPITAL DESIGN

SIR,—The modern hospital is a complex instrument and it must be designed by those who are to work within its walls. The R.S.M. discussion (*Lancet*, Dec. 13, p. 737) was timely. It is impossible for an architect to design a hospital alone; he must have the coöperation of the medical staff. This entails a great deal of thought on the part of the medical men concerned, and coöperation and patience on the part of the architect. In one hospital, for whose design I in conjunction with my medical colleagues was to some small degree responsible, sixteen plans were prepared before the final one was chosen. Other hospitals where this coöperation was lacking and which have left design to architects are saddled with unsatisfactory buildings. Many instances of this could be given, but I will cite two. In a medical school which has recently been rebuilt, the lecture theatre cannot be heated in winter. The heating is by warm air blown into the room and when it is turned on is so noisy that the lecturer cannot be heard. The seats are built at such an angle that in order to be heard by the audience at the back he has to have his head permanently hyperextended. Similarly in a newly erected private block there is no sound insulation between the patients' rooms or between the floors.

I would therefore urge strongly that the staff of any hospital that contemplates rebuilding should get together a year or so beforehand and make up their minds what they want, and where they want it, down to the minutest details, and not to place reliance upon an architect who manifestly is unable to design such a technical instrument as the hospital has become.

Harley Street, W.1. DAVID LEVI.

A NEW METHOD OF TREATING STAMMER

SIR,—The view that stammering is a symptom whose origin must be sought in the psychological field has been reached independently by medical psychologists and speech therapists. Study of its character and development shows that different types of stammering represent different stages of the same disorder. In the development of a stammer, the sequence of stages is the opposite of that found in normal development and evolution of speech; we are therefore justified in thinking of stammering in terms of Hughlings Jackson's theory of dissolution in the nervous system—the reversion (or regression) in disease to progressively more primitive types of function. The first stage of stammering is now generally regarded as due to a dissociation between thought and utterance. This disharmony leads to the reiteration of syllables, words or phrases (clonic stammer), a primitive type of utterance comparable to the prelinguistic babbling in the child's speech development. The forces which bring about a dissociation between thought and speech are usually but not necessarily emotional; at the onset they are unconscious to the mind of the speaker, and may remain so for some time. Unfortunately repetitive speech is stigmatised by those around the stammerer as "bad," "slovenly" or "childish"; he acquires the same misconception, endeavours to improve his speech and is exhorted to do so. But since the nature of his disorder is unrecognised, the steps he takes in order to stop the reiterations are erroneous and lead him into the second stage of stammering, characterised chiefly by hypertense articulation (tonic stammer). This hypertonicity represents those primordial hypertense postures which symbolise aggressive emotions. Once more the stammerer can see no way out. This blind-alley situation recurs at intervals, entailing a number of characteristic stages, and ultimately leads to complete discouragement and resignation.

Medical psychologists deal with a stammer in accordance with their views on the nature of the neuroses; speech therapists chiefly use relaxation, suggestion, persuasion, diversion or even philosophical methods (for example, the stoic doctrine). All these methods overlook the fact that stammering develops in stages. If a given stammerer's symptoms symbolise landmarks in his efforts to grope his way along the blind alley, treatment should permit and encourage him to go back in his manner of speech to the point where he diverged from the right track. This point is marked by reiterative (clonic) utterance. Unfortunately, to the stammerer and those in contact with him to speak in this babbling way means to stammer worse. Actually such speech is nearer to normal speech than any mode of speaking which he may have acquired on his way through the blind alley. The lack of hypertonicity in such reiterated utterances suggests to the patient the truth of this fact and he readily admits it; nevertheless the therapist's endeavours to induce him to retrace his steps to the clonic stage may meet with considerable resistance; the patient feels that the ostensibly babyish reiterated speech must increase his social difficulties. However, in suggesting the reversion, the therapist sanctions that infantile speech which has long been repressed, and thus acts as a symbol of the parent figures of the patient's infancy—a procedure sometimes leading to difficulties which cannot be dealt with here.

The method outlined has given promising results in a series of cases, and I draw attention to it at this stage because it may prove useful in treating cases precipitated by war stress.

Tavistock Clinic. LEOPOLD STEIN.

VOLPAR PRODUCTS

SIR,—In a recent paper (*Human Fertility* February, 1941, p. 1) Dr. R. L. Brown and Dr. C. J. Gamble describe their technique for testing the in-vitro efficiency of commercial spermicidal products. Their findings place Volpar at the head of a list of a number of such products, thus confirming the findings of Dr. J. R. Baker. This preparation was devised as a result of nearly ten years research by Dr. Baker and Dr. H. M. Carleton (whose joint book was reviewed in the *Lancet* 1936, **1**, 1071) and was only then put on the market. Dr. Brown and Dr. Gamble raise two important points: that contraceptive efficiency measured by laboratory methods does not necessarily tally with clinical experience; and that volpar contains a mercurial compound which has not yet been shown to be harmless when used regularly over a long period. The first point can only be settled by reports on clinical results, preferably recorded in a uniform and comparable way. The Family Planning Association had hoped to publish such evidence but the war has interfered with the collection of records; information is, however, slowly accumulating and will be published in due course. And with regard to the second point, no evidence of cumulative toxic action has been anywhere recorded. I have myself had under observation for periods ranging from 1 month to 4¼ years more than 500 patients regularly using volpar products, and in no case has there been any sign of mercurial poisoning.

Crediton, Devon. MARGARET HADLEY JACKSON,
Member of the Medical Subcommittee of the Family Planning Association.

CORONER'S COMMENT.—The quotation in Dr. Carling's letter (*Lancet*, Dec. 13, p. 748) should read "... your duty to comment on the *number* of the staff at the hospital."

Obituary

"WELSH OF FELTON"

Dr. Robert Anthony Welsh succeeded to the practice of Dr. Edward Anthony Hedley of Felton, Northumberland, married Hedley's daughter, and lived for 47 years in a Jacobean house known as "Peth Foot" which had been the home of a line of country doctors, father to son, for four generations. His life was, as he said himself, largely occupied in going to and fro; on some days he might travel 40 miles, seeing only four or five patients, and after he gave up his horses for a steam car and then a petrol car of French make he might still have to improvise a stretcher to carry an emergency case a mile or more over heathery moor. Difficult midwifery must be done single-handed and fractures were treated at home. Next to the motor-car the installation of the telephone brought the greatest change into his life. It is an old and inspiring story which he was induced while still in practice to tell in these columns under the heading "The Doctor's Day"—in the depths of the country. It was the life of his choice and if he had had his time over again he would still have been a country doctor. Welsh was born in 1864 and qualified at Newcastle in 1891; when he retired three years ago it was only to move nearer to Newcastle, where he died on Nov. 21. And his son, Dr. Edward Anthony Welsh, carries on the practice.

MEDICINE AND THE LAW

A Soldier dies of "Not Culpable Negligence"

UNDERSTAFFED as they may be, and preoccupied with the task of administering medical services without properly trained personnel, the military authorities will doubtless pay attention to the remarks of the coroner who recently investigated the death of a soldier at Llangollen. Our readers can form their own conclusions from the story and can decide the steps they would take to prevent the possibility of a similar occurrence.

Gunner Bird, R.A., aged 23, was the cook at a regimental medical post. Having a cold, he asked the V.A.D. nurse at the post for some medicine. She gave him a cough mixture. At about 10 P.M. on the next night (a Saturday) he went to the dispensary again for something for his cold; he asked for something different from the medicine of the previous night, because the cough mixture had done him no good. She gave him a dose of phenol, a teaspoonful in half a cup of water. He said it tasted strong; she gave him a cup of hot water. He said he was going to be sick. He went to the sink; he was not sick but said he had "needles and pins all over." The nurse shouted for another nurse stationed at the post, and the corporal in charge (who is responsible in the absence of the medical officer) was fetched. The corporal telephoned for the doctor and gave Bird a solution of salt and water. Having learnt what had happened, and given hurried instructions, the doctor went to his surgery to collect his bag and stomach-tube. While he was there, a second telephone message came; Bird's condition was worse and the nurses could get nothing down his throat. The doctor dashed to the post by car and found Bird in a comatose state; his symptoms were consistent with carbolic-acid poisoning. The stomach-tube was tried and the doctor did what he could, but the patient soon afterwards died. The medical officer in charge of the post, a major of the R.A.M.C., had remained there till 4 o'clock on this Saturday afternoon; he had telephoned at 9.30 P.M. and been told that everything was in order; he was summoned by telephone at 10.40 and went immediately to the dispensary where he found Bird dead.

The inquest elicited the following evidence. The nurse gave Bird the phenol because she "thought it was the same thing as she had bought from a chemist at Preston and had taken herself." She was a V.A.D. with two years' experience in an emergency hospital; this included night duty for nine months during which she gave out medicines in accordance with doctors' prescriptions. She did not know the strength of the phenol, had not seen it given for a cold or as a gargle, and was unaware that it was used for sterilising instruments. No-one had warned her that the bottle was dangerous; the only label on it was the word "Phenol." The bottle was on the shelf; there were mixtures at one end of the shelf and liniments at the other. The corporal knew that phenol was dangerous and a poison; he had not included it among the dangerous drugs which were locked away under his charge in the medical inspection room. The coroner asked a medical witness whether he would expect phenol to be left out on a shelf available for nurses or anybody else to administer. The witness replied in the negative: but it is probably not the usual practice to lock up the disinfectants, constantly required for sterilising instruments and dressings, with those potent drugs, dangerous in small doses, which are intended to be taken by the mouth. According to the witnesses there was no general right to walk in and out of the dispensary unless on business, and no nurse had any authority to give medicine except under doctor's orders or on a prescription. The bottle had no corrugated sides to distinguish it as containing a poison, though there was some corrugation on the bottom.

The corporal said he had brought the bottle with him when he came to the post; he had no instructions about labelling poisons; he was not supplied with labels, but some had been obtained from an outside source. He was a Nursing Orderly, class 3, trained by the R.A.M.C. He seems to have had no responsibility for this regrettable incident. This was not a case of the absent-minded taking of one bottle in mistake for another; death was apparently due to a nurse not knowing that phenol is carbolic acid and is not intended to be administered to the patient by the mouth, whether for a cold or any other ailment. The coroner held that there had been negligence but not culpable negligence of a criminal kind. He thought that the attention of the highest authorities should be drawn to what had occurred.

Medical News

University of Cambridge

At recent examinations the following were successful:—

FINAL EXAMINATION FOR M.B., B.CHIR.

Part I: Surgery, midwifery and gynæcology.—B. G. C. Ackner, V. R. Arulanandom, W. E. S. Bain, G. P. Baker, G. A. Barclay, J. A. V. Bates, W. J. M. Beveridge, J. A. Black, A. Bolton, P. F. Borrie, B. F. Brearley, M. M. Brown, C. D. Calnan, N. A. Campbell, P. W. S. Coghill, N. D. Compston, S. M. E. Cornes, J. W. A. Crabtree, E. G. A. Crawshaw, N. F. Crofts, M. C. Cross, G. E. L. Cummins, R. J. R. Cureton, R. E. Danckwerts, H. G. Danziger, G. H. Dhenin, R. Dobson, K. M. Duncan, P. D. Eeman, R. M. Emrys-Roberts, P. Eskell, G. E. Ffrench, T. N. Fison, J. B. Foote, D. G. R. Fox, A. C. Franks, F. S. Glassow, N. J. Goorney, J. A. B. Gray, G. F. Green, D. W. H. Griffiths, E. J. Harrison, E. J. Holborow, R. A. Holden, P. Hugh-Jones, A. Hulme, W. P. U. Jackson, M. R. Jeffrey, P. G. Jeffries, H. W. F. Jones, H. D. Juler, T. D. Kellock, D. E. R. Kelsey, J. M. S. Knott, H. M. Lawson, A. G. Leacock, K. T. Lockhart, H. E. Lockhart-Mummery, A. Lyell, M. L. Macalister, H. McColl, I. Macdonald, C. W. F. McKean, S. J. R. Macoun, H. G. McQuade, R. G. M[illegible]s, L. H. H. May, R. H. Meara, R. G. Miller, C. R. Naish, J. F. [illegible]D. A. H. O'Sullivan, R. A. Palmer, C. M. Phillips, J. S. Pipps, E. C. Poulton, J. R. K. Preedy, P. M. M. Pritchard, P. K. Renshaw, W. S. Rhodes, A. G. Richards, W. E. Roden, A. J. Rook, J. B. M. Rowlands, J. G. Salter, J. M. W. Sedgwick, P. B. Shaw, M. P. Sherwood, D. S. Short, E. G. Sita, J. F. P. Skrimshire, R. D. Slack, J. B. Stanton, M. G. P. Stoker, J. C. Swanson, R. D. Sweet, G. E. Thomas, E. G. Turner, E. Tylden, J. K. Wagstaff, R. J. Walker, J. C. Waterlow, R. B. Welbourn, B. C. Welshman, J. C. N. Westwood, G. Wetherley-Mein, R. H. Wheeler, R. U. Whitney, D. I. Williams, R. I. Williams, J. F. R. Withycombe, R. B. Wright, and J. B. Wyon.

University of Dublin

On Dec. 10, the following degrees were conferred at the school of physic, Trinity College:—

M.D.—Hyman Elliman, J. B. Fleming, Kenneth Watson, J. G. Waugh, and J. F. Wilde.

M.B., B.Ch., B.A.O.—N. J. Anderson, Emmeline P. Crowe, Margaret F. Y. Dixon, J. B. Dunlop, J. N. Greene, J. R. Hassard, T. L. Kelly, Ethna M. MacCarthy, A. J. B. McFarland, A. C. McReynolds, Kathleen M. J. Morphy, Jack Morris, J. A. Pearce, L. H. Shrago, J. P. Walsh, Dorothy H. Webster, and C. E. Williams.

Licence in medicine and in surgery and in obstetric science.—L. H. Citron.

University of Edinburgh

On Dec. 12, the following degrees and diplomas were conferred:—

M.D.—Fanny B. Chisholm, C. A. Gleadhill, A. M. MacDonald (gold medallist), *J. H. Patterson, *A. J. Rhodes.

D.Sc.—*C. E. van Rooyen.

M.B., Ch.B.—I. R. W. Alexander, R. F. Antonio, B. A. Bembridge, G. D. Bonner, William Boyd, A. K. Brown, L. F. Brown, W. J. J. Bryden, Rosemary E. Buchan, William Campbell, J. McD. Corston, John Devine, N. G. Douglas, N. K. Farley, W. D. Frew, E. R. L. Gregson, C. J. C. Hinnrichs, Jean Leith, Anne W. Maclennan, Dennis Malcolm, A. M. Plant, David Pottinger, S. I. Pugh, Anne R. McC. Ross, Margaret C. Tait, H. D. Thompson, D. R. Tipping, *Frederick Vledge, A. L. Wallis, J. A. Watt, and D. B. Wiseman.

D.P.H.—*A. S. Qunta, T. M. Small, *Helena S. L. Taylor.

D.M.R.—R. A. McKail.

* In absentia.

The degrees conferred by the Polish School of Medicine were given in THE LANCET of Dec. 20 (p. 780).

Royal College of Surgeons of Edinburgh

At a meeting of the college on Dec. 16, with Mr. J. W. Struthers, the president, in the chair, the Liston Victoria jubilee prize for the greatest benefit done to practical surgery in the preceding four years was awarded to Prof. J. R. Learmonth for his contributions to the surgery of the autonomic nervous system; and to Dr. Robert McWhirter for his contributions to the radiotherapy of malignant disease.

The following were admitted to the fellowship:—

H. E. Blake, M.R.C.S., J. H. Brownlee, M.B. Edin., L. S. Corner, M.B. Sydney, W. B. S. Crawford, M.B. Belf., J. S. Davidson, M.B. Edin., C. W. A. Falconer, M.B. Edin., R. D. Ferris, M.B. Melb., J. D. T. Jones, M.B. Durh., A. R. Leask, M.R.C.S., F. R. Miller, M.B. N.Z., E. T. Owen, M.B. Lpool, Guy Rigby-Jones, M.B. Camb., M. V. Sheehan, M.B. N.U.I., G. M. Sleggs, M.B. Lpool, G. C. Tweedie, M.B. Lpool, and P. J. M. Wright, M.B. Lond.

Royal Sanitary Institute

Dr. J. E. Gordon, professor of preventive medicine and hygiene at Harvard University, who is in charge of the American Red Cross Harvard Field Hospital in this country, has been elected an honorary fellow of the institute.

American Honours

The American Congress of Physical Therapy has awarded a gold key to President Franklin D. Roosevelt, in appreciation of his long interest and support of the medical fight against infantile paralysis. Keys have also been given to Dr. William Bierman, attending physical therapist at Mt. Sinai hospital, New York; and to Lieut.-Colonel W. S. C. Copeman, honorary secretary of the British Rheumatism Association, in recognition of his development of a physical therapy organisation in the battle field.

The *Times* Picayune loving cup for 1940 has been presented to Dr. Rudolph Matas of New Orleans "in recognition of his years of unselfish service to his fellow men."

Billets for the Day

The Ministry of Health and the Board of Education have issued a joint circular (Nos. 2535 and 1573 of the respective ministries) advising local authorities how to speed up the provision of day nurseries and play centres for the children of women taking jobs. But it points out that the greatest contribution to the task of dealing with these children must come from the stay-at-home women of the district, who must divide between them the duty of looking after the children of those at work. The names of women willing to work if their children are cared for, and of women willing to share in the care of the children should be sent to the local authorities and, with the help of voluntary organisations, the two groups should be put in touch with each other and helped in making friendly arrangements about the children which may if they wish be extended to children of school age. The circular stresses that it is the duty of the welfare authority to set up a central office to act as a liaison between the mothers and the volunteers. No more than three children should be cared for in an ordinary working-class home and health visitors should pay special attention to these guest children. Probably the women will prefer to make their own arrangements about payment but if need be the Government are ready to offer financial help under the scheme of daily guardians which is being administered by the regional controllers of the Ministry of Labour. It is described in their leaflet (E.D.L. 67 revised). Forms of application for registration as a daily guardian can be obtained at the local office of the Ministry. In addition to whatever weekly sum the mother arranges to pay to the guardian herself the state will pay 4*s.* a week for each child under five cared for on four days or more, and 2*s.* a week for each child for less than four days. An application for this payment must be signed by both mother and guardian.

Public Health

From the Annual Reports

HENDON

HERE Dr. A. Fairgrieve Adamson reports an increase in infantile mortality from 34 to 54, largely due to high fatality from respiratory diseases, which was spread evenly throughout the year and not limited to the first quarter. Dr. Adamson says: "at no time were the shelters used to their full capacity, most persons preferring to remain in their own houses or to use shelters of the Anderson or other types." This seems to be usual in the towns of the outer ring of the metropolis.

BOOTLE

This county borough, according to Dr. F. T. H. Wood's report, had an estimated population of 67,760 in mid-1940, a reduction of 9010 from the 1931 census. In estimating civil populations, those in the services of the Crown are excluded, and since these now number several millions, all estimated civil populations are artificially lowered, and since men and women in the services are of ages at which death is exceptional all death-rates are artificially exalted. In Bootle the recorded death-rate was 17·3, against 12·4 in 1939, and the birth-rate 22·5, the highest rate since 1932, against the England and Wales rate of 14·6. Infantile mortality was 80 against 65 in 1939. The increase in infant deaths was mainly due to respiratory diseases in the first quarter of the year.

ILFRACOMBE

In contrast to these industrial cities Dr. D. C. Adam tells us that Ilfracombe had a birth-rate of 9·5, a corrected death-rate of 8·4, a tuberculosis mortality of 0·59 and an infantile mortality of 50. There was only one maternal death, but this gave a maternal mortality of 9·71. The estimated population was 10,160. There were 96 notifications of scarlet fever, which is high for such a small population, but there was no death from the disease. The negligible fatality of scarlet fever throughout the country since the start of the war is noteworthy.

STAFFORD

Dr. D. H. Binks in his report for this borough remarks that the corrected death-rate of 11·7 was above the ten years' average "probably due to the exclusion of the young members of both sexes who are now in the Services." There is another reason for an apparent rise in the death-rate which applies to all places which have been reception areas since the beginning of the war. The rate is in fact based on the mid-year population of 35,320. In the reception areas the numbers of evacuees steadily fell during the first part of 1940 when all was quiet but rose rapidly when the war spread to Britain, so the average population of the year was higher than the mid-year estimate. This makes all the vital-statistic rates based on the latter artificially high. Dr. Binks calls attention to the effect of the war on housing in reception areas—suppression of clearances and of building, and the temporary reconditioning of houses condemned or ready for condemnation. After the war the badly destroyed towns must have first claim on the building industry, but the state of the towns which have not suffered from air-raids must be kept in mind.

Infectious Disease in England and Wales

WEEK ENDED DEC. 6

Notifications.—The following cases of infectious disease were notified during the week: smallpox, 0; scarlet fever, 1324; whooping-cough, 1725; diphtheria, 1103; paratyphoid, 8; typhoid, 17; measles (excluding rubella), 667; pneumonia (primary or influenzal), 979; puerperal pyrexia, 178; cerebrospinal fever, 132; poliomyelitis, 14; encephalitis lethargica, 3; dysentery, 165; ophthalmia neonatorum, 83. No case of cholera, plague or typhus fever was notified during the week.

The number of civilian and service sick in the Infectious Hospitals of the London County Council on Dec. 3 was 1346, including scarlet fever, 157; diphtheria 301; measles, 37; whooping-cough, 477; enteritis, 52; chicken-pox, 46; erysipelas, 33; mumps, 17; poliomyelitis, 5; dysentery, 8; cerebrospinal fever, 11; puerperal sepsis, 18; enteric fevers, 17; malaria, 1; other diseases (non-infectious), 76; not yet diagnosed, 90.

Deaths.—In 126 great towns there were no deaths from scarlet fever, 1 (0) from enteric fevers, 1 (0) from measles, 6 (1) from whooping-cough, 27 (1) from diphtheria, 28 (1) from diarrhœa and enteritis under 2 years, and 29 (1) from influenza. The figures in parentheses are those for London itself.

Cardiff reported 1 death from an enteric fever.

The number of stillbirths notified during the week was 177 (corresponding to a rate of 37 per thousand total births), including 14 in London.

Births, Marriages and Deaths

BIRTHS

LIGHTWOOD.—On Dec. 19, at Gerrards Cross, Bucks, the wife of Dr. Reginald Lightwood—a son.

PARNELL.—On Dec. 15, in London, the wife of Dr. R. W. Parnell—a daughter.

SWAIN.—On Dec. 14, at St. Albans, the wife of Dr. R. H. A. Swain—a son.

MARRIAGES

CALDWELL—DUNBAR.—On Dec. 20, at Burnham, Bucks, Kenneth Peter Somerville Caldwell, M.B., to Dorothy Anderson Dunbar.

KEITH—PAKEMAN.—On Dec. 19, in London, John Stobart Keith to Evelyn May Pakeman, M.B.

STAFFORD-CLARK—STEWART.—On Dec. 16, at Mundham, Sussex, David Stafford-Clark, M.B., squadron-leader R.A.F.V.R., to Dorothy Stewart (*née* Crosley-Oldfield).

DEATHS

BEGG.—On Dec. 17, Alexander Clarke Begg, O.B.E., M.D. Edin., M.B. Lond., consulting physician to the Swansea Hospital.

FLEMMING.—On Dec. 19, at Upper Basildon, near Reading, Percy Flemming, M.D. Lond., F.R.C.S., aged 78

GRAY.—On Dec. 20, at Epsom, James Hugo Gray, M.D. Adelaide, professor of anatomy at St. Mary's Hospital, Paddington, aged 32.

HARRISSON.—On Dec. 15, at St. Neots, Hunts, Ernest Henry Harrisson, M.A., M.D. Camb., aged 64.

STABB.—On Dec. 19, at Torquay, E. Carthew Stabb, F.R.C.S., aged 78

The fact that goods made of raw materials in short supply owing to war conditions are advertised in this paper should not be taken as an indication that they are necessarily available for export.

Notes, Comments and Abstracts

TYNESIDE PROSPECT

In the fifth reprint and second edition, since 1940, of his survey of social conditions on Tyneside,[1] Mr. D. M. Goodfellow, Ph.D., has done more than repeat the facts about high infant and tuberculosis death-rates, and the other penalties of the years of depression which make such bitter reading; he has added two new chapters about regional planning, and in doing so lays bare a tangle of conflicting values. The Royal Commission on Local Government found great disparity in the health services throughout the Tyneside area. Some of the poorest towns make the best efforts to improve their social services, though they can only do so by taxing their citizens and thus increasing poverty; some towns reach high standards in services which in a neighbouring town may hardly exist; and in many services the national standard is only reached in Newcastle itself. Thus the social services as a whole do not correspond to the needs of the area. To overcome such disparities the commission proposed the establishment of a new region, to consist of industrial Tyneside plus Northumberland county, and the formation of a new municipal borough to include the whole of industrial Tyneside. Dr. Goodfellow, though he favours the regional idea, insists that to believe the mere advent of regions would automatically solve all problems is a bad mistake. To weld Tyneside into one with the county might lead to over-emphasis on agricultural interests, and hence to disparities of social services within the region as wide as any now found on Tyneside. Moreover it would divide industrial Tyneside from its natural partner, Durham, with which it has close economic and cultural ties. The commission, indeed, suggested that the new region might later include Durham, but Dr. Goodfellow believes that it would be better if it did so from the start, if only because of Durham's considerable achievements in social services which would help to serve as a pattern and encouragement to Tyneside. The county of Durham is at once smaller than Northumberland and much more heavily industrialised; its inclusion in the region would not introduce the preponderance of agricultural interests to be feared from linking Tyneside only with Nurthumberland. The new Tyneside borough, in the view of the commission, should have powers corresponding to those exercised by a municipal borough. Thus it would have control of drainage, sewerage, street-scavenging, the inspection of slaughter-houses and the maintenance of minor roads, but it seems likely that the maternity and child-welfare services would come under the regional authority. There is a chance, Dr. Goodfellow believes, that such limited scope as these powers offer might fail to attract the right type of councillor. Housing, too, would be a special problem. Some Tyneside towns have attacked housing troubles with great tenacity and success in the past twenty-five years—Felling council, for example, have turned their overcrowded slum-ridden district into one of the best and most beautiful garden cities in the country. Councils which carry out big housing schemes become big landlords and big employers of labour and they have an important share in town planning and industrial development; citizens begin to visit the council offices to pay rents and discuss repairs, and thus get to know the officials and councillors. It seems to them proper that the council should control the schools, and they feel they have a personal share in their own schools and their own municipal housing. If a new great municipal borough is formed it will take over the council houses of all districts, and this keen sense of local responsibility will be lost. More disrupting still, housing will come under an authority which has no means of coördinating it with town and industrial planning, public-health services or education. It might be better, Dr. Goodfellow feels, to invest all powers in the regional authority, provided the region included both Northumberland and Durham with Tyneside in the middle. Such a north-eastern region could take united decisions on industrial planning and uniform development of social services on lines suited to both agricultural and industrial districts, and could ensure equitable treatment by the national exchequer. Moreover a really clever authority might find means to foster and maintain a sense of local responsibility among the citizens of its various districts, and that would be something new in large-scale local government.

1. Tyneside: The Social Facts. Newcastle-on-Tyne: Coöperative Printing Society. 1941. Pp. 100. 1s.

GOOD ENGLISH EARTH

Now that we must deck our table from our own fields, agriculture is coming into her own again; and long may we all enjoy it. She has been a struggling industry too long. *England and the Farmer* (Editor: H. J. Massingham. London: B. T. Batsford. Pp. 152. 10*s.* 6*d.*), a timely symposium of authoritative opinion, deserves to be widely read and pondered. In a vigorous introduction, Mr. Massingham pleads for a return to the small mixed farm, to farming for subsistence rather than, by a prostitution of scientific knowledge, for big profits. This note is stressed by other writers, notably Dr. L. J. Picton in his provocative article on diet and farming in which he contrasts the difference between the food produced by the sea and the land. The sea is self-manuring. "All the wastes of the sea remain in the sea. . . . Its cycle of fertility is established . . . and its by-product is vigour"; but food from the land nowadays is largely produced by means of chemical applications with consequent loss of quality and a vast legacy of defective nutrition and subnormal health. There is a quiet dignity about this book, and the many beautiful photographs enhance its charm.

MEDICAL DIRECTORY FOR 1942

Punctual as ever in its appearance the new directory contains 65,394 names, being 1090 more than in the 1941 issue. It is easy to believe that 300 fewer doctors are living in London, not so easy to guess the significance of 500 more names in the Scots and Irish sections. But we must not in these days inquire too closely where our colleagues are working; we must try to be content with having at all events an up-to-date box number. Other signs of the times are the occasional heading "emergency hospital," and the list of 962 temporarily registered practitioners (not included in the figures already given). Among the universities from which these have qualified, to mention a selection from the first column, are Bratislava, Toronto, Oklahoma, Cracow, Prague, Vermont, Würzburg, Lwow, Ohio, Vienna, Warsaw, Berlin. Medicine indeed has joined hands across the world. With sympathetic regret we note that the resetting in new and clearer type has made no further advance. The price of the directory remains at 63*s.*, from J. & A. Churchill.

Triofax Triple Dye Jelly, issued by Burroughs Wellcome and Co. in collapsible tubes, contains gentian violet, brilliant green and euflavine, incorporated in a stable water-soluble jelly. It is intended for application to burns, especially of the hand and face.

Solution of last week's crossword puzzle

B	I	S	E	C	T	S	■	A	C	O	N	I	T	E
R	■	A	■	O	■	T	■	P	■	U	■	M	■	R
E	N	C	E	P	H	A	L	O	G	R	A	P	H	Y
A	■	C	■	E	■	R	■	S	■	S	■	E	■	T
S	O	H	O	■	A	M	B	I	T	■	I	N	C	H
T	■	A	■	M	■	A	■	T	■	P	■	E	■	R
S	U	R	G	E	O	N	■	A	B	L	A	T	I	O
■	■	O	■	A	■	■	■	E	■	R	■	■	■	■
A	L	M	O	N	E	R	■	A	D	A	M	A	N	T
M	■	Y	■	S	■	E	■	B	■	T	■	B	■	O
O	U	C	H	■	S	N	O	R	E	■	S	L	A	P
E	■	O	■	I	■	E	■	A	■	T	■	E	■	P
B	A	S	E	D	O	W	S	D	I	S	E	A	S	E
I	■	I	■	E	■	E	■	A	■	I	■	R	■	■
C	U	S	T	A	R	D	■	D	E	F	O	R	M	S

Appointments

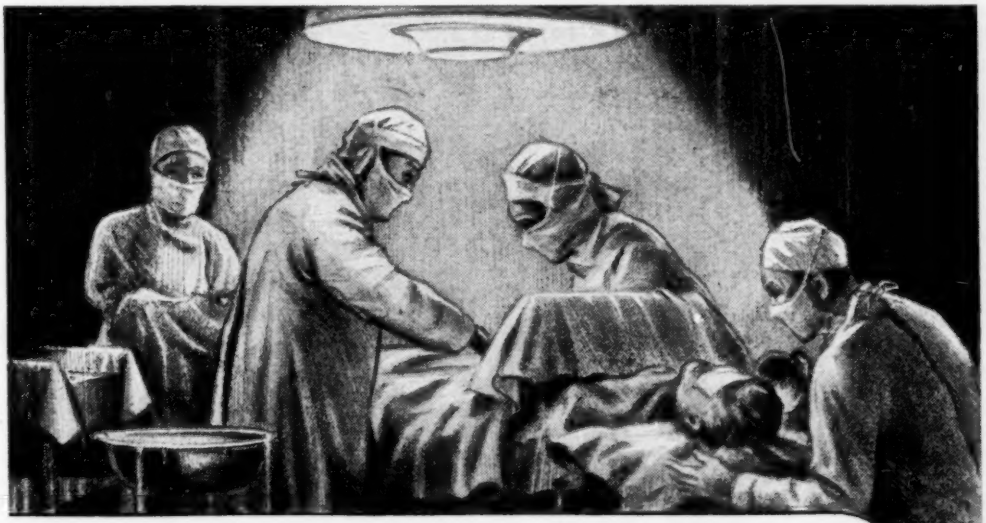
Cargill, W. P., M.B. Manc., D.P.H.: deputy M.O.H. for Southampton.

D'Amian, Else, M.D., L.R.C.P.E.: part-time assist. M.O. for Swinton and Pendlebury.

Gamgee, Katherine, M. L., M.R.C.S., D.P.H.: asst. M.O.H. (maternity and child welfare) for Middlesbrough.

Jones, Olwen, M.B. Lond.: medical registrar at the Royal Free Hospital.

Roberts, G. I., M.B. Lpool: R.S.O. at the municipal accident unit, Cardiff.



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1940. PROC. SOC. EXP. BIOL. & MED., 43, 401.

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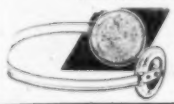

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Secretary.....Major WALTER L. GIFFARD, O.B.E.

A year ago, on behalf of the Royal Medical Foundation of Epsom College, we appealed to members of the Medical Profession, and to all other helpers and subscribers to maintain, if humanly possible, their subscriptions to this Medical Charity.

The support that has been given in the past twelve months has been very gratifying, and we should wish to thank everyone sincerely for their help.

It cannot be expected that the financial situation of our Pensioners, Annuitants and Grantees will improve in 1942.

We therefore ask for a continuance of your support, feeling that we shall not be asking in vain.

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BRITISH POSTGRADUATE MEDICAL SCHOOL
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WAR SURGERY OF ABDOMEN
5th to 9th January, 1942

Monday, 5th Jan.	10 A.M.	Introduction	Sir James Walton, K.C.V.O., M.S., F.R.C.S., F.A.C.S.
	11.15 A.M.	Types of Abdominal Wounds and their Consequences.	Mr. V. Zachary Cope, M.S., F.R.C.S.
	12.15 P.M.	Pre-operative and Post-operative Treatment of Abdominal Wounds.	Mr. R. H. Franklin, F.R.C.S.
	2 P.M.	Operative Surgery Demonstration.	Mr. A. K. Henry, F.R.C.S.
Tuesday, 6th Jan.	10 A.M.	Injuries of the Kidney and Ureter, including Gunshot Wounds.	Mr. John Everidge, O.B.E., F.R.C.S.
	11.15 A.M.	The Bladder in War Injuries.	Mr. John Everidge, O.B.E., F.R.C.S.
	2 P.M.	The Pathology of Abdominal Wounds.	Mr. R. T. Payne, M.S., F.R.C.S.
Wednesday, 7th Jan.	10 A.M.	Wounds of Solid Viscera..	Prof. G. Grey Turner, LL.D., D.Ch., M.S., F.R.C.S.
	11.15 A.M.	Gunshot Wounds in the Field.	Lieut.-Col. W. Underwood, F.R.C.S.
	12.30 P.M.	X-ray Demonstration ..	Dr. Duncan White, M.B., Ch.B., D.M.R.E.
	2 P.M.	Immediate Complications of Abdominal Wounds.	Surg.-Comdr. Frank Stabler, M.D., F.R.C.S.
	3 P.M.	Some Late Complications and Sequelæ.	Surg.-Comdr. Frank Stabler, M.D., F.R.C.S.
Thursday, 8th Jan.	10 A.M.	Gunshot Wounds of Rectum and Large Bowel.	Mr. G. T. Mullally, M.S., F.R.C.S.
	11.15 A.M.	Technique of Operation for Abdominal Wounds.	Lieut.-Col. W. Underwood, F.R.C.S.
	2 P.M.	Gunshot Wounds of Urethra.	Mr. Clifford Morson, O.B.E., F.R.C.S.
	3.15 P.M.	Gunshot Wounds of External Genitalia.	Mr. Clifford Morson, O.B.E., F.R.C.S.
Friday, 9th Jan.	10 A.M.	Abdomino-thoracic Wounds.	Mr. R. C. Brock, M.D., F.R.C.S.
	11.15 A.M.	Complications of Gunshot Wounds of Rectum and Large Bowel.	Mr. A. L. Abel, M.S., F.R.C.S.
	12.30 P.M.	Anæsthesia	Dr. H. Woodfield Davies, L.M.S.S.A.
	2 P.M.	Some Personal Observations on Casualties Seen in the Present War.	Brig. P. H. Mitchiner, C.B.E., M.S., F.R.C.S.

The fee for the Course is one guinea. Officers of the Armed Forces wishing to attend these lectures without payment of the fee should apply through their respective Director-Generals. Applications for admission should be addressed to the DEAN, British Postgraduate Medical School, Ducane-road, London, W.12.

Further War Surgery Courses will commence as follows :—
WAR MEDICINE .. .. .. MONDAY, 19TH JANUARY, 1942.
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FINAL EXAMINATION: SURGERY, January 12th, February 9th, March 9th, 1942; MEDICINE, January 19th, February 16th, March 16th, 1942; MIDWIFERY, January 20th, February 17th, March 17th, 1942.

For regulations apply REGISTRAR, Apothecaries' Hall, Black Friars-lane, London, E.C.4.

University College, Cork.

PROFESSORSHIP OF PHYSIOLOGY.

The Governing Body of University College, Cork, invites applications for the above full-time Professorship.

For further particulars apply to :—
JOSEPH DOWNEY, Secretary.

London County Council.
MAUDSLEY HOSPITAL MEDICAL SCHOOL
(UNIVERSITY OF LONDON).

PSYCHOLOGICAL MEDICINE.

A Series of Lectures on Psychology suitable for a Diploma in Psychological Medicine will be held at the Maudsley Hospital, Denmark Hill, S.E.5, on Mondays, Wednesdays and Fridays, from 2 to 4 p.m., commencing 5th January, 1942.

Twelve Lectures on Psychology, including the Practical Application of Tests.
By E. L. Trist, M.A.; J. C. Raven, M.Sc.; and Patrick Slater, B.A.

Twelve Lectures on Medical Psychology.
By Aubrey J. Lewis, M.D., F.R.C.P.; and W. H. Gillespie, M.D., M.R.C.P.

The fee for the above course is £3 3s., which is payable at the time of enrolment on 5th January.

SPRINGFIELD HOUSE
'Phone : BEDFORD 3417. **Near BEDFORD**
For Mental Cases with or without Certificates.
Ordinary Terms : Five Guineas per week (including Separate Bedrooms for all suitable cases without extra charge).
For forms of admission, &c., apply to the Resident Physician, CEDRIC W. BOWER.
INTERVIEWS IN LONDON BY APPOINTMENT.

Telephone: WELbeck 2728 Telegrams: "ASSISTIANO, LONDON"
For MEDICAL, SURGICAL, and
MENTAL NURSES
Male or Female
THE NURSES' ASSOCIATION
In conjunction with the MALE NURSES' ASSN.
28, YORK ST., BAKER ST., LONDON, W.1
Mrs. MILLICENT HICKS, Superintendent W. J. HICKS, Secretary

ST. ANDREW'S HOSPITAL
FOR NERVOUS AND MENTAL DISORDERS
NORTHAMPTON

FOR THE UPPER AND MIDDLE CLASSES ONLY.

PRESIDENT: THE MOST HON. THE MARQUESS OF EXETER, K.G., C.M.G., A.D.C.

MEDICAL SUPERINTENDENT: THOMAS TENNENT, M.D., F.R.C.P., D.P.H., D.P.M.

This Registered Hospital is situated in 130 acres of park and pleasure grounds. Voluntary patients, who are suffering from incipient mental disorders or who wish to prevent recurrent attacks of mental trouble; temporary patients, and certified patients of both sexes are received for treatment. Careful clinical, bio-chemical, bacteriological, and pathological examinations. Private rooms with special nurses, male or female, in the Hospital or in one of the numerous villas in the grounds of the various branches can be provided.

WANTAGE HOUSE

This is a Reception Hospital in detached grounds with a separate entrance, to which patients can be admitted. It is equipped with all the apparatus for the complete investigation and treatment of Mental and Nervous Disorders by the most modern methods: insulin treatment is available for suitable cases. It contains special departments for hydrotherapy by various methods, including Turkish and Russian baths, the prolonged immersion bath, Vichy Douche, Scotch Douche, Electrical baths, Plombieres treatment, etc. There is an Operating Theatre, a Dental Surgery, an X-Ray Room, an Ultra-violet Apparatus, and a Department for Diathermy and High-frequency treatment. It also contains Laboratories for bio-chemical, bacteriological, and pathological research. Psychotherapeutic treatment is employed when indicated.

MOULTON PARK

Two miles from the Main Hospital there are several branch establishments and villas situated in a park and farm of 650 acres. Milk, meat, fruit, and vegetables are supplied to the Hospital from the farm, gardens, and orchards of Moulton Park. Occupational therapy is a feature of this branch, and patients are given every facility for occupying themselves in farming, gardening, and fruit growing.

BRYN-Y-NEUADD HALL

The seaside house of St. Andrew's Hospital is beautifully situated in a Park of 330 acres, at Llanfairfechan, amidst the finest scenery in North Wales. On the North-West side of the Estate a mile of sea coast forms the boundary. Patients may visit this branch for a short seaside change or for longer periods. The Hospital has its own private bathing house on the seashore. There is trout-fishing in the park.

At all the branches of the Hospital there are cricket grounds, football and hockey grounds, lawn tennis courts (grass and hard courts), croquet grounds, golf courses, and bowling greens. Ladies and gentlemen have their own gardens, and facilities are provided for handicrafts, such as carpentry, etc.

For terms and further particulars apply to the Medical Superintendent (TELEPHONE: No. 2356 and 2357 Northampton), who can be seen in London by appointment.

CRICHTON ROYAL, DUMFRIES
FOR NERVOUS AND MENTAL DISORDERS

Cases of Alcoholism and Drug Addiction are admitted. Every facility for individual treatment on the most modern lines. **Special Department for Insulin Therapy.** Fully equipped Gymnasium, Golf Course, and Indoor Swimming Pool. Specially trained Occupational and Recreational Therapists.

Medical Certificates given anywhere in the British Isles are valid for admission of patients.

Physician Superintendent: **P. K. McCOWAN**, J.P., M.D., F.R.C.P., D.P.M., Barrister-at-Law. Telephone: Dumfries 1119.

THE COTSWOLD SANATORIUM

On the Cotswold Hills seven miles from Cheltenham, Stroud and Gloucester. Fully equipped for the treatment of all forms of Tuberculosis. **Terms: 5½ to 9½ guineas per week, inclusive.** Full particulars from MEDICAL SUPERINTENDENT, Cotswold Sanatorium, Cranham, Gloucester. *Telephone:* Witcombe 81. *Telegrams:* "Hoffman, Birdlip."

CAMBERWELL HOUSE, 33, Peckham Road, London, S.E.5

Telegrams: "PSYCHOLIA, LONDON" — *Telephone:* RODNEY 4242 (2 lines)

FOR THE TREATMENT OF MENTAL DISORDERS

Completely detached Villas for mild cases. Voluntary Patients received. Twenty acres of grounds; own garden produce. Hard and grass tennis courts, putting greens, Recreation Hall with Badminton Court, and all indoor amusements. Occupational therapy, Calisthenics, Actino-therapy, prolonged immersion baths, shock and also modified insulin treatment. Chapel.

Senior Physician, Dr. **HUBERT JAMES NORMAN**, assisted by a resident Medical Staff and visiting Consultants

An Illustrated Prospectus giving fees, which are strictly moderate, may be obtained upon application to the Secretary

The Convalescent Branch is HOVE VILLA, BRIGHTON, and is 200 ft. above sea-level

COURT HALL, KENTON, near EXETER

FOR THE TREATMENT OF EIGHT LADIES, VOLUNTARY, TEMPORARY AND CERTIFIED PATIENTS

CLIFFDEN, TEIGNMOUTH

FOR EARLY AND CONVALESCENT CASES — Recreational Therapies are held daily by skilled Leaders

The house stands high with spacious balconies and extensive views of the South Devon Coast. Beautiful garden. Own Dairy in 25 acres. Private road to beach

There is also a charming house, **EBWORTHY, MANATON, DARTMOOR**, situated in 20 acres, 1100 ft. up for bracing moorland air

Resident Physicians—BERTHA M. MULES, M.D., B.S. ANNE S. MULES, M.R.C.S., L.R.C.P. *Telephones*—STARCROSS 259 and TEIGNMOUTH 289

HAYDOCK LODGE,
NEWTON-LE-WILLOWS, LANCASHIRE.

For the reception and treatment of PRIVATE PATIENTS of both sexes of the UPPER AND MIDDLE CLASSES suffering from Mental and Nervous Disorders, Alcoholism and Drug Addiction, either voluntarily, temporarily, or under certificate. Patients are classified in separate buildings according to their mental condition. Situated in park and grounds of 400 acres. Self-supported by its own farm and gardens in which patients are encouraged to occupy themselves. Every facility for indoor and outdoor recreation. For terms, prospectus, etc., apply MEDICAL SUPERINTENDENT. *Telephone:* Ashton-in-Makerfield 7311. *Telegraphic Address:* Wootton, Ashton-in-Makerfield.

THE OLD MANOR, SALISBURY

Telephone: 3216 & 3217

A Private Hospital for the Care and Treatment of those of both sexes suffering from MENTAL DISORDERS

Extensive grounds. Detached Villas. Chapel. Garden Produce from own gardens. Terms very moderate.

CONVALESCENT HOME AT BOURNEMOUTH

standing in 12 acres of ornamental grounds, with separate villas, tennis courts, etc. Patients or Boarders may visit the Home by arrangement.

Illustrated Brochure on application to the Medical Superintendent, The Old Manor, Salisbury.

THE RETREAT, YORK

The Pioneer Hospital, opened 1796, for the humane treatment of those suffering from Nervous and Mental Disorder

This Hospital of 200 beds, administered by a Committee of the Society of Friends, combines what is best in the investigation and treatment of nervous illness with a sympathetic and friendly atmosphere. Last year 121 patients were admitted, of whom 80 were voluntary cases.

Much curative work is accomplished in our mental hospitals to-day and the recovery rate compares very favourably with that of our general hospitals.

For information and terms of admission apply to:—
The Physician Superintendent,
ARTHUR POOL, M.R.C.P.
(Telephone: York 3612)
who is available for consultation

CHEADLE ROYAL CHEADLE CHESHIRE

A Registered Hospital for MENTAL DISEASES, and its Seaside Branch, GLAN-Y-DON, Colwyn Bay, N. Wales

THE object of this Hospital is to provide the most efficient means for the treatment and care of those of the Upper and Middle Classes suffering from MENTAL and NERVOUS DISEASES. The Hospital is governed by a Committee appointed by the Trustees of the Manchester Royal Infirmary. VOLUNTARY, TEMPORARY, AND CERTIFIED PATIENTS RECEIVED

For Terms and further information apply to the MEDICAL SUPERINTENDENT *Telephone:* GATLEY 2231

TOR-NA-DEE SANATORIUM

Managing Director: DAVID LAWSON, M.D., F.R.S.E.

FOR THE TREATMENT OF PULMONARY TUBERCULOSIS AND ALLIED DISEASES

Medical Superintendent: R. Y. KEERS, M.D. (Edin.)

For prospectus apply to The Secretary, Tor-na-Dee, Murtle, Aberdeenshire Telephone: Cults 107

PECKHAM HOUSE, 112, Peckham Road, London, S.E.15

Telegrams: "Alleviated, London" Telephone: Rodney 2641-2642

A Private Mental Hospital, for Ladies and Gentlemen suffering from Nervous and Mental Illness, where the amenities of a comfortable home are combined with full investigation and every well-established modern treatment.

Terms from 3½ guineas weekly.

Illustrated Prospectus may be obtained from the Physician Superintendent.

CALDECOTE HALL

NUNEATON
WARWICKSHIRE
('Phone: Nuneaton 241)

Residential treatment of
"Nervous Disorders" & Alcoholism
(Certifiable cases are not received)

This beautiful mansion situated in the heart of the country (less than two hours from London by L.M.S.R.) and surrounded by charming pleasure grounds in which games and outdoor occupational therapy are available is devoted to the treatment of Alcoholism and "Nerves" by psychotherapeutic and ancillary methods.

Illustrated Brochure and particulars obtainable from A. H. CARVER, M.D., D.P.M., Resident Medical Superintendent.

THE MAGHULL HOMES FOR EPILEPTICS (INC.)

MAGHULL (Near Liverpool)

FARMING and OPEN AIR OCCUPATION for PATIENTS

A few vacancies in 1st and 2nd Class Houses.

FEES:
1st Class (men only) from £3 p.w. upwards.
2nd Class (men and women) 32/- p.w.

For further particulars apply
Secretary,
C. EDGAR GRISEWOOD, A.C.A., 20 Exchange St. East, Liverpool

THE COPPICE, NOTTINGHAM

HOSPITAL FOR MENTAL DISEASES

President: The Right Hon. LORD BELPER

REGISTERED HOSPITAL for Voluntary, Temporary, or Certified PRIVATE PATIENTS of UPPER and MIDDLE CLASSES. Own kitchen garden. Modern forms of treatment, including Electro-shock Therapy. Out-door games, cinema visits, motor drives arranged. Visiting Chaplain.

For terms, &c., apply to: Dr. G. M. WODDIS, Medical Superintendent. Telephone: 64117 Nottingham.

STRETTON HOUSE,

Church Stretton, Shropshire.

ESTABLISHED IN 1853.

A PRIVATE HOME for the treatment of gentlemen suffering from Mental and Nervous illness, including the allied Disorders of Alcoholism and the Drug Habit. All types of early Mental and Nervous Cases are received without Certificates as Voluntary Patients under the provisions of the Mental Treatment Act, 1930. Bracing hill country. See "Medical Directory," p. 2358.—Apply to the Medical Superintendent. 'Phone 10 P.O., Church Stretton.

CITY OF LONDON MENTAL HOSPITAL

Near DARTFORD, KENT.

Ladies and Gentlemen received for treatment under certificates, and without certificates as either VOLUNTARY or TEMPORARY PATIENTS, at a weekly fee of £2 9s., and upwards.

NORTHUMBERLAND HOUSE

GREEN LANES,
FINSBURY PARK, N.4

A PRIVATE HOSPITAL for the treatment of mental and nervous illnesses. Conveniently situated and easy of access from all parts. Occupational Therapy, Psychotherapy, and other modern forms of treatment. A.R.P. Shelters.

Telephone: Stamford Hill 2688.

For further particulars apply to the MEDICAL SUPERINTENDENT.

CHISWICK HOUSE,

PINNER, MIDDLESEX.

Telephone: PINNER 234.

A Private Hospital for the Treatment and Care of Mental and Nervous Illnesses in both Sexes.

A modern country house, 12 miles from Marble Arch, in attractive and secluded surroundings. Fees from 10 guineas per week inclusive. Cases under Certificate, Voluntary and Temporary Patients received for treatment.

DOUGLAS MACAULAY, M.D., D.P.M.

MALLING PLACE, KENT

For LADIES and GENTLEMEN of Unsound Mind.

Terms moderate. Apply to Resident Medical Superintendent. Telegrams: ADAM WEST MALLING. Telephone No. 2: MALLING.

FENSTANTON at "FIVE DIAMONDS," Chalfont St. Giles, Bucks

A Private Home for the Care and Treatment of a limited number of LADIES with Mental and Nervous Disorders. Certified, Voluntary, and Temporary Patients received. Mansion with 12 acres of ground. (See *Medical Directory*, p. 2362.) Apply Resident Physician. Telephone: Little Chalfont 2046. Station: Chalfont and Latimer.

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PRIVATE MENTAL HOME for Nervous and Mental Illness. All forms of treatment available. Fees from 4 gns. per week upwards according to requirements. Vacancies occasionally exist at reduced fees on the recommendation of the patient's own physician.

Apply to Dr J. A. SMALL. Telephone: Norwich 80

THE GROVE HOUSE,

CHURCH STRETTON, SHROPSHIRE.

Private Home for Ladies mentally ill. Voluntary and Temporary Patients received.

Medical Superintendent: Dr. J. A. MCCLINTOCK.

St. Mark's Hospital for Cancer, Fistula,

AND OTHER DISEASES OF THE RECTUM,
City-road, London, E.C.1.

Applications are invited from Male registered medical practitioners, including R practitioners who now hold A posts, for the appointment of a HOUSE SURGEON (B2), for six months from 1st February, 1942. Salary at the rate of £200 per annum, with board, residence, and laundry.

Applications, with copies of testimonials, to reach the undersigned on or before 10th January, 1942.

RAYMOND BULL, Secretary.

Connaught Hospital,

Walthamstow, E.17. (118 Beds.)

Applications are invited immediately from registered medical practitioners, including R practitioners within three months of qualification, for the following appointments: HOUSE SURGEON (A) and CASUALTY OFFICER (A), both vacant 5th January, 1942. If held by R practitioners, appointments will be for a period of six months. Salary at the rate of £175 per annum, with board, residence, and laundry.

Applications, stating age, qualifications, nationality, and accompanied by copies of three recent testimonials, should be sent to the undersigned immediately.

R. HALTON HARRISON, General Secretary.

Applications are invited from fully

qualified medical Women for the following posts:—

ELIZABETH GARRETT ANDERSON HOSPITAL, Euston-road, N.W.1.—B2 post: One RESIDENT MEDICAL OFFICER.

OSTER HOUSE HOSPITAL, St. Albans.—B2 post: One RESIDENT MEDICAL OFFICER, with care of surgical beds. A post: One HOUSE PHYSICIAN.

Suitably qualified R practitioners now holding A posts may apply for the B2 appointments, and those within three months of qualification for the A post.

Appointments to commence 1st February, 1942, for six months. Salaries on E.M.S. scale, with a minimum of £125, will be pooled and allocated according to experience.

Applications, with two copies of each of three testimonials, should be sent to the SECRETARY of the Elizabeth Garrett Anderson Hospital by 19th January, 1942.

Middlesex County Council.

MIDDLESEX COLONY, SHENLEY, Near ST. ALBANS, HERTS.

THIRD ASSISTANT MEDICAL OFFICER (B1) (Temporary) required immediately at the above-named Institution certified for the reception of mental defectives. Suitably qualified R practitioners holding B1 or B2 appointments may apply. Commencing salary £365 per annum (an increment considered at end of twelve months' satisfactory service), plus furnished apartments, board, and attendance.

Applications (no forms provided) to be addressed to Medical Superintendent, "B3," of Colony.

C. W. RADCLIFFE, Clerk of the County Council.

Guildhall, Westminster, S.W.1.

East Ham Memorial Hospital,

Shrewsbury-road, E.7.

Applications are invited from registered medical practitioners (Male) for the post of HOUSE PHYSICIAN AND CASUALTY OFFICER (B2). Suitably qualified R practitioners holding A posts may apply. The appointment is for six months, commencing 1st January, 1942. Salary £200 per annum, with board, residence, and laundry.

Applications, stating age, nationality, experience, and full particulars, together with copies of three testimonials, should be forwarded to the undersigned immediately.

REGINALD PERRY, Secretary-Superintendent.

Metropolitan Borough of Islington.

APPOINTMENT OF TEMPORARY MEDICAL OFFICER (CIVIL DEFENCE)

Applications are invited for the post of Temporary Medical Officer (Male) for Civil Defence duties. The duties of the post will be concerned mainly with the training of Civil Defence personnel and assisting in the work of the Casualty Services as required.

The commencing salary will be £600 per annum in the case of a whole-time officer, but suitable candidates prepared to offer substantial part-time services, at a proportionate salary, would also be considered. The appointment will be terminable by one month's notice in writing on either side.

Applications, together with copies of three testimonials, should be sent to the Medical Officer of Health and endorsed "Medical Officer (C.D.)" not later than Monday, 5th January, 1942. W. ERIC ADAMS, Town Clerk.

The Town Hall, Upper Street, N.1.

Barking Corporation.

BARKING HOSPITAL.

Applications are invited from British registered general practitioners (Male or Female) for the appointment of HOUSE SURGEON (A), including R practitioners within three months of qualification when appointment will be for a period of six months. In addition to hospital duties, opportunities for experience will be given by allocation of duties in connexion with the Corporation's public health services outside the Hospital. Salary £200 per annum, together with usual residential emoluments.

Applications, with age, qualifications, and two recent testimonials, immediately to MEDICAL SUPERINTENDENT, Barking Hospital, Upney-lane, Barking, Essex.

City of Manchester.

WITHINGTON HOSPITAL. (1150 Beds.)
(Recognised under the regulations for the F.R.C.S.)

APPOINTMENT OF RESIDENT ASSISTANT MEDICAL OFFICER (A).

Applications are invited from registered medical practitioners (Male or Female) for the above mentioned appointment which is vacant now, including R practitioners within three months of qualification, when appointment will be for a period of six months. Otherwise it will be for a period of twelve months. The basic salary for the appointment is £200 per annum or, if held by an R practitioner as above, £125 per annum with board, residence and laundry in addition. A temporary cost-of-living wages award is payable in addition to the foregoing salaries. The appointment is subject to the Manchester Corporation conditions of service.

Full information and forms of application may be obtained from the Medical Officer of Health, Hospitals Administration Section, P.O. Box 399, Town Hall, Manchester 2, and applications for the post must be received by him not later than January 7th, 1942.

Canvassing in any form is prohibited.

R. H. ADCOCK, Town Clerk.

Town Hall, Manchester 2, 18th December, 1941.

Northumberland County Council.

HEXHAM HOSPITAL. (400 Beds.)

APPOINTMENT OF HOUSE SURGEON (A).

Applications are invited from registered medical practitioners for the above appointment, including R practitioners within three months of qualification. The appointment will be tenable for a period of six months. Salary £120 per annum, together with the usual residential emoluments.

Applications, stating age, qualifications with dates, and nationality, accompanied by copies of two recent testimonials, should be forwarded immediately to the Department of the County Medical Officer, New Senior School, Mitford Road, Morpeth, Northumberland.

C. HAROLD CARTER, Clerk of the Council.

Saint Mary's Hospitals, Whitworth

PARK, MANCHESTER, 13.

Applications are invited from registered medical practitioners, including R practitioners who now hold A posts, for the appointments of:

OBSTETRICAL HOUSE SURGEON (B2),
GYNÆCOLOGICAL HOUSE SURGEON (B2),

to become vacant on 1st February, 1942, for six months. The salaries to be at the rate of £75 per annum, with full residential emoluments.

Applications, stating age, nationality, qualifications with dates, experience, and details of previous appointments, and accompanied by copies of three recent testimonials, should be sent to the undersigned not later than 12th January, 1942.

A. R. WISE, Superintendent and Secretary.

County Borough of Smethwick.

TEMPORARY RESIDENT MEDICAL OFFICER AND ASSISTANT MEDICAL OFFICER OF HEALTH (B1 POST)

Applications are invited from registered medical practitioners (Male or Female) for the post of Resident Medical Officer at the Smethwick and Oldbury Joint Isolation Hospital, and Assistant Medical Officer of Health and Assistant School Medical Officer for the County Borough of Smethwick. The appointment is temporary during the absence of the present officer on war service. Salary will be at the rate of £400 per annum, from which a deduction of £150 per annum will be made in respect of board, residence and laundry. The applicant will be required to reside at the Fever Hospital and undertake the clinical care of the patients and will also be expected to do School Medical Inspection and Infant Welfare work, and such other work as may be required by the Medical Officer of Health. Previous experience as a Resident in a Fever Hospital is essential. Suitably qualified R practitioners holding B2 or B1 appointments are invited to apply.

Forms of application may be obtained from the Medical Officer of Health, Public Health Department, Hales Lane, Smethwick, to whom applications endorsed "Assistant Medical Officer of Health, &c." and accompanied by copies of three recent testimonials should be delivered as soon as possible.

Canvassing, directly or indirectly, will disqualify.

FRANK CHAPMAN, Town Clerk.

Council House, Smethwick, 20th December, 1941.

Manchester Royal Infirmary.

WHOLE-TIME MEDICAL CHIEF ASSISTANT (B1).

Applications are invited from registered medical practitioners for the above appointment to become vacant early in January, 1942. Applicants must have held house appointments and had medical experience. Preference will be given to candidates holding higher qualifications. Suitably qualified R practitioners holding B2 or B1 appointments are invited to apply. Salary is at the rate of £350 to £400 per annum if non-resident, and £250 to £300 per annum if resident, according to qualifications and experience.

One copy of application, stating age, nationality, qualifications with dates, experience and details of previous appointments, and accompanied by one copy of three recent testimonials, should be forwarded not later than 6th January, 1942, to the undersigned. By Order.

F. J. CABLE, General Superintendent and Secretary.

18th December, 1941.

Kent and Sussex Hospital, ROYAL TUNBRIDGE WELLS.

APPOINTMENT OF EAR, NOSE AND THROAT HOUSE SURGEON AND RESIDENT ANÆSTHETIST (B2).

Applications are invited from registered medical practitioners (Male) for the appointment of Ear, Nose and Throat House Surgeon and Resident Anæsthetist (B2) to become vacant January 25th, 1942, including R practitioners who now hold A posts, when the appointment will be limited to six months. The salary is at the rate of £200 per annum, with full residential emoluments.

Applications, stating age, qualifications with dates, nationality and present post, and accompanied by copies of three recent testimonials, should be sent to the undersigned as soon as possible.

TOM B. HARRISON, Superintendent-Secretary.

20th December, 1941.

Lancashire County Council.

COUNTY HOSPITAL, WHISTON, PRESCOT, NR. LIVERPOOL.

APPOINTMENT OF JUNIOR RESIDENT MEDICAL OFFICER (A).

Applications are invited for the above appointment from registered medical practitioners, Male and Female, including R practitioners within three months of qualification. The hospital is a general hospital dealing with acute work and comprises 1300 beds. Salary is at the rate of £120 per annum, together with the usual residential emoluments and the appointment will be for a period of six months.

The person appointed will be required to take up duty at an early date. Forms of application may be obtained from the County Medical Officer of Health, Hospital and Medical Department, County Offices, Preston, to whom all applications, accompanied by copies of not more than two recent testimonials, must be forwarded not later than Monday, the 12th January, 1942.

GEORGE ETHERTON, Clerk of the County Council.

County Offices, Preston, 20th December, 1941.

Addenbrooke's Hospital, Cambridge.

Applications are invited from registered medical practitioners (unmarried), Male and Female, for the appointment of HOUSE OFFICER to the Examination Halls Annexe (A) (100 Beds) to become vacant on 15th January, 1942, including R practitioners within three months of qualification. The appointment will be for a period of six months, but is terminable at an earlier date by one month's notice on either side. Salary is at the rate of £130 per annum, with full residential emoluments.

Applications, stating age, qualifications with dates, and nationality, and accompanied by copies of three recent testimonials, should be sent to the undersigned not later than Wednesday, 7th January, 1942.

J. A. BEARDSALL, Secretary-Superintendent.

Royal Victoria Infirmary, Newcastle UPON TYNE.

(836 Beds.)

RESIDENT APPOINTMENTS.

Applications are invited from registered medical practitioners, Male and Female (including R practitioners within three months of qualification), for 11 A Appointments, which become vacant on 1st February, 1942. The appointments are tenable for six months, and successful applicants will be allocated to one of the following posts:—

HOUSE PHYSICIANS,
HOUSE SURGEONS,
HOUSE SURGEON to ORTHOPÆDIC DEPARTMENT,
HOUSE SURGEON to ACCIDENT ROOM,
ANÆSTHETISTS,
HOUSE SURGEON to LEAZES HOSPITAL.

The Anæsthetists will receive salary at the rate of £50 per annum if the post is held by an A practitioner and at the rate of £200 per annum if held by a Practitioner of special experience and qualifications in anæsthetics. All other Residents are remunerated at the rate of £50 per annum. Intending applicants are asked to apply to the House Governor's Office for a copy of the regulations governing the appointments, and applications must be on the official form of application.

Applications, accompanied by copies of not more than three testimonials, should be received by me not later than first post on Friday, 2nd January, 1942.

A. W. SANDERSON, House Governor.

19th December, 1941.

Royal Victoria Hospital, Newcastle UPON TYNE.

REGISTRAR TO THROAT, NOSE AND EAR DEPARTMENT (B1).
(Open Appointment.)

Applications are invited for the post of Registrar to the Throat, Nose and Ear Department. Candidates must be registered in Medicine and in Surgery and must be Fellows of the Royal College of Surgeons of England or Edinburgh. Suitably qualified R practitioners holding B2 or B1 appointments are invited to apply. The appointment is for one year and may be renewed annually for a period not exceeding three years. The rate of remuneration is £100 per annum (non-resident).

Applications, with copies of not more than three testimonials, should be sent not later than Friday, 2nd January, 1942, to the undersigned, from whom any further particulars may be obtained.

A. W. SANDERSON, House Governor.

19th December, 1941.

Northampton General Hospital.

(405 Beds.)

Applications are invited immediately from registered medical practitioners, including R practitioners within three months of qualification when appointment will be for a period of six months, for the appointments of:—

HOUSE SURGEON (A) having some Fracture experience.
HOUSE SURGEON (A) to the OBSTETRICAL AND GYNÆCOLOGICAL DEPARTMENT.

Salary at the rate of £150 per annum, with board, residence and laundry.

Applications, stating age, qualifications with dates, nationality, and accompanied by copies of three recent testimonials, should be sent to the undersigned as soon as possible.

GORDON S. STURTRIDGE, M.B., B.S., Superintendent.

20th December, 1941.

Norfolk and Norwich Hospital, NORWICH. (440 Beds.)

Applications are invited from registered medical practitioners (Male and Female), including R practitioners within three months of qualification, for the following A appointments:—

HOUSE PHYSICIAN,
GENERAL HOUSE SURGEON,
HOUSE SURGEON TO THE ORTHOPÆDIC DEPARTMENT.

The appointments will be for six months. Salary at the rate of £170 per annum, with full residential emoluments. Applicants may apply for more than one of the above posts, and if so must state the order of their preference.

Applications, stating age, nationality, qualifications, and accompanied by copies of three testimonials, should be sent to the undersigned not later than Tuesday, 6th January, 1942.

FRANK INCH, House Governor and Secretary.

County Borough of Hastings.

TEMPORARY DEPUTY AND ASSISTANT MEDICAL OFFICER OF HEALTH AND SCHOOL MEDICAL OFFICER.

Applications are invited from duly qualified medical practitioners for the above appointment, at a salary of £650 per annum, plus £85 per annum car allowance. In addition to other duties, the officer appointed will assist in connexion with A.R.P. casualty services, and such other duties as may be assigned by the Medical Officer of Health to the officer appointed.

Further particulars, together with forms of application, can be obtained from the undersigned.

Applications, under cover endorsed "Temporary Deputy Medical Officer," to be delivered at my office, "Summer Fields," Bohemia-road, St. Leonards, not later than Saturday, the 3rd January, 1942.

Canvassing will be a disqualification.

D. W. JACKSON, Town Clerk.

Summer Fields, Town Hall, Hastings.

HIS MAJESTY'S COLONIAL SERVICE

THE COLONIAL MEDICAL SERVICE

VACANCIES FOR MEDICAL OFFICERS

The maintenance of an efficient Colonial Medical Service constitutes a vital part of the national war effort and it is most important that the Service should be assured of an adequate supply of doctors.

The Secretary of State for the Colonies therefore invites applications from doctors possessing a medical qualification registrable in the United Kingdom who are British subjects and who are under thirty-five years of age.

Medical Officers are appointed in the first instance for general service. But there are ample opportunities for work in special branches of medicine and surgery, in public health and in medical research.

The normal salary scale is from £600 to between £1,000 and £1,120. There are large numbers of super-scale posts to which promotion is made on merit and which carry higher salaries.

Government quarters, in many cases free of rent, and first-class passages to and from the Colonies are provided, and an adequate pension scheme is in force.

Selected candidates are normally required to attend a course of instruction in Tropical Medicine and Hygiene either before proceeding overseas or during their first period of leave.

Further particulars, including the regulations governing admission to the Colonial Medical Service, may be obtained from the Director of Recruitment (Colonial Service), 2, Park-street, London, W.1.

Herefordshire General Hospital,

HEREFORD. (210 Beds.)

Applications are invited from registered medical practitioners (Male or Female), including R practitioners within three months of qualification, for the appointment of JUNIOR HOUSE SURGEON (A), including House Surgeon to Ear, Nose, and Throat Department. The appointment will be limited to six months. Salary is at the rate of £150 per annum, with full residential emoluments.

Applications, stating age, qualifications, and nationality, and accompanied by copies of three recent testimonials, should be sent to the undersigned.

T. W. UPTON, Secretary.

Bristol Royal Hospital.

RADIO DIAGNOSTICIAN.

The services of a duly qualified whole-time Radio Diagnostician are temporarily required in the Radiological Department at the Bristol General Hospital. Salary £500 per annum, non-resident.

Applications, stating age and experience, accompanied by copies of testimonials, to be forwarded to the undersigned, from whom further particulars may be obtained.

THOMAS W. GREGG, F.C.C.S., Secretary.

Bristol General Hospital.

Staffordshire County Council.

APPOINTMENT OF RESIDENT MEDICAL OFFICER (B2), LICHFIELD PUBLIC ASSISTANCE INSTITUTION.

Applications are invited from registered medical practitioners, Male and Female, for the above-mentioned appointment, including R practitioners who now hold A appointments. Salary is at the rate of £200 per annum, with full residential emoluments. Appointments will be of a temporary nature, subject to one month's notice on either side. If held by an R practitioner it will be limited to six months.

Applications, stating age, qualifications with dates, nationality, and present post, and accompanied by copies of three recent testimonials, should be sent to the undersigned not later than 3rd January, 1942.

H. L. UNDERWOOD, Clerk of the County Council.

County Buildings, Stafford, 15th December, 1941.

Bexhill Hospital, Bexhill-on-Sea.

Applications are invited from registered medical practitioners, Male or Female, for the appointment of a RESIDENT MEDICAL OFFICER (A), including R practitioners within three months of qualification when appointment will be for a period of six months. Salary is at the rate of £175 per annum, with board, residence, and laundry.

Applications, stating age, qualifications with dates, and nationality, and accompanied by copies of three recent testimonials, should be sent to the undersigned immediately.

FREDK. GEARY, Secretary.

Bracebridge Heath Mental Hospital,

BRACEBRIDGE HEATH, Near LINCOLN.

TEMPORARY ASSISTANT MEDICAL OFFICER (B1).

Applications are invited from registered medical practitioners for the above (whole-time) appointment. R practitioners should not apply. Salary £7 7s. per week, with the usual residential emoluments. Additional £50 per annum if holder of the D.P.M. (Eng.).

Apply, with copies of testimonials, to the MEDICAL SUPERINTENDENT.

Bedford County Hospital.

Applications are invited from registered medical practitioners, Male and Female, for the appointment of a HOUSE SURGEON (A post), to become vacant the middle of January, including R practitioners within three months of qualification when appointment will be for a period of six months. Salary is at the rate of £150 per annum, with full residential emoluments.

Applications, stating age, qualifications with dates, and nationality, and accompanied by copies of three recent testimonials, should be sent to the SECRETARY, Honorary Medical Staff Committee, as soon as possible.

Bootle General Hospital,

Linacre-lane, BOOTLE, LIVERPOOL, 20.
(123 Beds.)

HOUSE SURGEON (SPECIAL DEPARTMENTS), ALSO CASUALTY OFFICER.

Applications are invited from registered medical practitioners, Male and Female, for the above A appointments, including R practitioners within three months of qualification. Appointments are for six months from the 1st January, 1942. Salary £150 per annum, with full residential emoluments.

Applications, stating age, nationality, qualifications, and accompanied by copies of three recent testimonials, should be sent to the undersigned.

A. J. COOPER, Secretary-Superintendent.

Salford Royal Hospital.

Applications are invited from registered medical practitioners, Male and Female, including R practitioners within three months of qualification, for the following appointment: HOUSE SURGEON (A) to SPECIALS DEPARTMENT, which will become vacant on 19th January, 1942. Salary at the rate of £125 per annum, with full residential emoluments. The appointment is normally for six months.

Applications, on the prescribed form, should be sent at once to the undersigned, from whom further particulars and form of application are obtainable.

H. B. SHELSWELL, General Superintendent and Secretary.

5th December, 1941.

Kent County Ophthalmic and Aural

HOSPITAL, MAIDSTONE. (158 Beds.)

Applications are invited from registered medical practitioners of either sex for the post of OPHTHALMIC HOUSE SURGEON (B2), to become vacant in mid-January, including R practitioners who now hold A posts when appointment will be limited to six months; otherwise it will possibly be extended for a second six months. Applicants should have had experience in Ophthalmology. The Hospital is fully recognised by the Examining Board for the D.O.M.S. Salary is at the rate of £350 per annum, with full residential emoluments.

Applications, stating age, qualifications with dates, nationality, and present post, should be sent to the undersigned.

JOHN W. STRICKLAND, Secretary.

East Suffolk and Ipswich Hospital,

IPSWICH.
(400 Beds.)

Applications are invited from registered medical practitioners for the appointment of RESIDENT MEDICAL OFFICER (B1) to this Hospital and Medical Superintendent to the Branch Hospital (50 Beds), vacant on 10th March, 1942. Applicants should have held house appointments and had surgical experience. Preference will be given to candidates holding Diploma of F.R.C.S. Suitably qualified R practitioners holding B2 or B1 appointments are invited to apply. The minimum salary is £350 or according to qualifications and experience.

Applications, stating age, nationality, qualifications with dates, experience and details of previous appointments, and accompanied by copies of three recent testimonials, should be sent to the undersigned. ARTHUR GRIFFITHS, Secretary.

The Hospital, Ipswich, 27th December, 1941.

Joint County Council of Moray & Nairn.

Applications are invited for the post of COUNTY MEDICAL OFFICER OF HEALTH for the Combined County of Moray and Nairn. Unless in special circumstances applicants will not be considered where over 45 years of age. Salary £850 per annum rising by annual increments of £30, on approved service, to a maximum of £1000. Canvassing will be a disqualification.

Terms and conditions of the appointment may be obtained from the undersigned, and applications (twelve copies), stating qualifications, age and other particulars, accompanied by copies of three recent testimonials, must be lodged on or before 15th January, 1942.

ROBERT MCGILL, County Clerk.

Elgin, 16th December, 1941.

The Warwickshire and Coventry

JOINT COMMITTEE FOR TUBERCULOSIS.

KING EDWARD VII MEMORIAL SANATORIUM, HERTFORD HILL, Near WARWICK.

APPOINTMENT OF JUNIOR ASSISTANT MEDICAL OFFICER.

Applications are invited from registered medical Women practitioners for the appointment of Junior Assistant Medical Officer at the above Sanatorium. The appointment will be for six months and may be renewed for a further period of six months. The salary is at the rate of £250 per annum, with full residential emoluments.

Applications, stating age, qualifications with dates, nationality, and present post, and accompanied by copies of three recent testimonials, should be sent to the Medical Superintendent, King Edward VII Memorial Sanatorium, Hertford Hill, near Warwick, not later than 2nd January, 1942.

L. EDGAR STEPHENS, Clerk to the Joint Committee.

Shire Hall, Warwick, 9th December, 1941.

Manchester Royal Infirmary.

Applications are invited from registered medical practitioners, Male, for the appointment of SENIOR HOUSE SURGEON (Central Branch) (B1), to become vacant on 1st February, 1942. Applicants should have held house appointments and had surgical experience. Preference will be given to candidates holding diploma of F.R.C.S. Suitably qualified R practitioners holding B2 or B1 appointments are invited to apply. Salary is at the rate of £150 per annum, with residence.

Fifteen copies of applications, stating age, nationality, qualifications with dates, experience, and details of previous appointments, and accompanied by fifteen copies of three recent testimonials, should be forwarded not later than 1st January, 1942, to the undersigned.

By Order,
F. J. CABLE, General Superintendent and Secretary.

Harrogate Royal Bath Hospital.

(National Hospital for Rheumatic Diseases.)
(Normal complement, 146 Beds.)

Applications are invited from registered medical practitioners (Male) for the appointment of a HOUSE SURGEON (A), to become vacant in January, 1942, including R practitioners within three months of qualification. The appointment is for six months. Salary at the rate of £200 per annum, with full residential emoluments. Special facilities for study and research (thesis).

Applications, stating age, qualifications with dates, and nationality, accompanied by copies of three recent testimonials, to be sent to the undersigned. E. P. L. DIXON, M.A.

Harrogate Royal Bath Hospital, Harrogate.

The Guest Hospital, Dudley.

(The Resident Staff consists of a Resident Surgical Officer and Three House Surgeons.)

Applications are invited from registered medical practitioners, Male, for the appointment of HOUSE SURGEON (A), including R practitioners within three months of qualification when the appointment will be for a period of six months. Salary at the rate of £200 per annum, with full residential emoluments.

Applications, stating age, qualifications with dates, and nationality, and accompanied by copies of three recent testimonials, should be sent to the undersigned.

H. RAYMOND HURST, House Governor and Secretary.

10th December, 1941.

Addenbrooke's Hospital, Cambridge.

Applications are invited for the following appointments from registered medical practitioners, Male and Female (unmarried):

(*a*) HOUSE SURGEON (A), to become vacant on 1st February, 1942.
(*b*) HOUSE PHYSICIAN (A), to become vacant on 14th February, 1942.
(*c*) HOUSE PHYSICIAN (A), at the LEYS SCHOOL ANNEXE, to become vacant on 19th February, 1942.

R practitioners within three months of qualification may apply. The appointments will be for a period of six months, but terminable at an earlier date by one month's notice on either side. Salary in each case is at the rate of £130 per annum, with full residential emoluments.

Applications, stating age, qualifications with dates, and nationality, and accompanied by copies of three recent testimonials, should be sent to the undersigned not later than Wednesday, 31st December, 1941.

J. A. BEARDSALL, Secretary-Superintendent.

Staffordshire County Council.

ASSISTANT COUNTY MEDICAL OFFICER OF HEALTH AND MEDICAL OFFICER OF HEALTH.

Applications are invited for the joint whole-time appointment of an Assistant County Medical Officer of Health for the Administrative County of Stafford and Medical Officer of Health for the Darlaston Urban District (population 20,300). The salary will be at the rate of £800 per annum, and will be subject to the provisions of the Local Government Superannuation Act, 1937.

Applicants must be fully qualified medical Men with experience in public health duties and must hold the Diploma in Public Health. The person appointed will, as regards his duties as Assistant County Medical Officer of Health, act under the direction of the County Medical Officer of Health, and will be required to perform such duties as may be from time to time prescribed. As regards his duties as District Medical Officer of Health, the officer will be subject to the sole control and direction of the local Sanitary Authority.

The joint appointment is subject to the approval of the Minister of Health and Board of Education, and also, so far as the office of District Medical Officer of Health is concerned, to the provisions of the Sanitary Officers (Outside London) Regulations, 1935.

The joint appointment will be subject to three calendar months' notice on either side, subject, so far as the office of District Medical Officer of Health is concerned, to the consent of the Minister of Health.

The successful candidate will be required to pass a medical examination and to produce a birth certificate.

Forms of application may be obtained from the undersigned, and should be returned by first post on the 8th January, 1942, together with copies of not more than three testimonials.

H. L. UNDERWOOD, Clerk of the County Council.

County Buildings, Stafford, 12th December, 1941.

Derbyshire County Council.

TEMPORARY APPOINTMENT OF WOMAN ASSISTANT MATERNITY AND CHILD WELFARE MEDICAL OFFICER.

The Derbyshire County Council require the services of a fully qualified whole-time Temporary Woman Assistant Maternity and Child Welfare Medical Officer with experience in antenatal work, midwifery, and children's diseases, to hold (under the direction of the County Medical Officer of Health) consultations at the Antenatal and Maternity and Child Welfare Centres of the Derbyshire County Council, and to perform such other duties as appertain to the office.

The salary will be £600 per annum, rising by £25 per annum to £700 per annum.

The post will be subject to the provisions of the Local Government Superannuation Act, 1937, and the successful candidate will be required to pass a medical examination.

Forms of application may be obtained from the undersigned, to whom they must be returned, together with copies of not more than three recent testimonials, not later than 3rd January, 1942. W. M. ASH, County Medical Officer of Health.

New County Offices, St. Mary's Gate, Derby,
12th December, 1941.

Royal Sheffield Infirmary and Hospital.

Applications are invited from registered medical practitioners for the appointment of RESIDENT SURGICAL OFFICER (B1) at the ROYAL HOSPITAL UNIT, to become vacant on 15th February, 1942. Applicants should have held house appointments and had surgical experience. Preference will be given to candidates holding diploma of F.R.C.S. Suitably qualified R practitioners holding B2 or B1 appointments are invited to apply.

Applications, stating age, nationality, qualifications with dates, experience, and details of previous appointments, and accompanied by copies of three recent testimonials, should be sent to the undersigned not later than 31st December, 1941.

W. H. BOOTH, Secretary.

The Liverpool Eye, Ear and Throat

INFIRMARY, Myrtle-street, LIVERPOOL, 7.

Applications are invited from registered medical practitioners (Male or Female) for appointment of OPHTHALMIC HOUSE SURGEON (B2), to become vacant on 1st January, 1942, including R practitioners who now hold A posts when the appointment would be limited to six months. Salary at rate of £120 per annum, with full residential emoluments.

Applications, stating age, experience, qualifications with dates, nationality, and present post, and accompanied by copies of three testimonials, should be sent to the undersigned immediately.

GEORGE NICKSON, Secretary.

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PUBLISHED by the PROPRIETORS, THE LANCET LIMITED, 7, Adam Street, Adelphi, in the County of London.
Editorial Office Address, 26, Temple Street, Aylesbury, Bucks (Aylesbury 315).
Printed by HAZELL, WATSON & VINEY, LTD., London and Aylesbury—Saturday, December 27, 1941.
PRINTED IN GREAT BRITAIN—Entered as Second Class at the New York, U.S.A., Office.

City of Plymouth.

MOUNT GOLD HOSPITAL. (200 Beds.)

Applications are invited for the post of RESIDENT SURGICAL OFFICER (B1) at the above Hospital. The duties are mainly in the Orthopædic and M.S. sections of the Hospital, but the person appointed may be required for duties in the Pulmonary Tuberculosis wards. Applicants should have held house appointments and had surgical experience. Suitably qualified R practitioners holding B2 or B1 appointments are invited to apply. Salary is at the rate of £300 per annum, with full residential emoluments and a war bonus of £15 12s. per annum. The appointment is terminable by one month's notice on either side.

Applications, stating age, nationality, qualifications with dates, experience, and details of previous experience, and accompanied by copies of three recent testimonials, should be sent to the undersigned as soon as possible and not later than January 12th, 1942.

The Medical Officer of Health.

Seven Trees, Lipson-road, Plymouth.

General Hospital, Nottingham.

(495 Beds+75 M.S. Beds.)

Applications are invited from registered medical practitioners (Male and Female), including R practitioners within three months of qualification, for the appointment of RESIDENT CASUALTY OFFICER (A) for the above Hospital. Duties to commence on 24th January. The appointment is for six months. Salary at the rate of £200 per annum, with full residential emoluments.

Applications, stating age, qualifications with dates, and nationality, and copies of testimonials, should be sent to the undersigned.

HENRY M. STANLEY, House Governor and Secretary.

General Hospital, Nottingham.

(Total 570 Beds.)

Applications are invited from registered medical practitioners (Male or Female), including R practitioners within three months of qualification, for the appointment of a HOUSE SURGEON (A) for the above Hospital. The appointment is for six months. Duties to commence on 24th January. Salary at the rate of £200 per annum, with full residential emoluments.

Applications, stating age, qualifications with dates, and nationality, and copies of testimonials, should be sent to the undersigned.

HENRY M. STANLEY, House Governor and Secretary.

Rotherham Hospital.

SECOND CASUALTY OFFICER (A).

Applications are invited from registered medical practitioners (Male) for the above appointment, now vacant, including R practitioners within three months of qualification when appointment will be for a period of six months. Salary £175 per annum, with full residential emoluments.

Applications, stating age, qualifications with dates, and nationality, accompanied by copies of three recent testimonials, should be sent to the undersigned forthwith.

T. H. FLETCHER, Secretary-Superintendent.

Rotherham Hospital, Doncaster Gate, Rotherham, Yorks.

Beckett Hospital and Dispensary,

BARNSLEY.

Applications are invited from registered medical practitioners for the appointment of JUNIOR HOUSE SURGEON (A). R practitioners within three months of qualification may apply when appointment will be for a period of six months. Salary £150 per annum, with board, residence, and laundry.

Applications, stating age, qualifications with dates, nationality, and accompanied by copies of three recent testimonials, should be sent to the undersigned immediately.

ARTHUR L. BOURNE, Secretary-Superintendent.

9th December, 1941.

North Staffordshire Royal Infirmary,

STOKE-ON-TRENT.

Applications are invited from registered medical practitioners, including R practitioners holding A posts, for the post of HOUSE SURGEON to the EAR, NOSE, AND THROAT and EYE DEPARTMENTS (B2). The appointment will be for a period of six months, and salary is at the rate of £150 per annum, with board, residence, and laundry.

Applications, stating age, qualifications with dates, and nationality, accompanied by three copy testimonials, should be sent to the undersigned as soon as possible.

THORNBURROW GIBSON, Secretary and House Governor.

Worthing Hospital.

Applications are invited from registered medical practitioners, Male, for the appointment of a HOUSE SURGEON (A) and HOUSE PHYSICIAN (A), which became vacant on the 20th December, including R practitioners within three months of qualification. The appointment will be for a period of six months. Salary at the rate of £130 per annum, with full residential emoluments.

Applications, stating age, qualifications with dates, and nationality, and accompanied by copies of three recent testimonials, should be sent to the undersigned.

Worthing Hospital. A. V. OAKTON, House Governor.

Chelmsford and Essex Hospital,

London-road, CHELMSFORD, ESSEX.

(235 Beds.)

Applications are invited for the post of CASUALTY OFFICER AND RESIDENT ANÆSTHETIST (A), Male or Female. R practitioners within three months of qualification may apply, when appointment will be for a period of six months. Salary £150 per annum, plus board, lodging, and laundry.

Apply, with recent testimonials, to the undersigned immediately. R. G. MORRISH, House Governor and Secretary.

Preston and County of Lancaster

ROYAL INFIRMARY.

Applications are invited from registered medical practitioners for the post of HOUSE SURGEON (A) to the EYE AND EAR, NOSE, AND THROAT DEPARTMENT. R practitioners within three months of qualification may apply, when appointment will be for a period of six months. Salary at the rate of £150 per annum, with the usual residential allowances.

Applications, stating age and qualifications with dates, and nationality, and accompanied by copy testimonials, should be sent to Mr. JOHN GIBSON, Superintendent and Secretary.

Kettering and District General

HOSPITAL.

APPOINTMENT OF A HOUSE PHYSICIAN (A).

Applications are invited from registered medical practitioners for the appointment of a House Physician (A), including R practitioners within three months of qualification when appointment will be for a period of six months. Salary is at the rate of £200 per annum, with full residential emoluments.

Applications, stating age, qualifications with dates, and nationality, and accompanied by copies of three recent testimonials, should be sent to the undersigned as soon as possible.

G. W. JACKSON, Secretary-Superintendent.

The Prince of Wales's Hospital,

Greenbank-road, PLYMOUTH.

Applications are invited from registered medical practitioners for the appointment of RESIDENT SURGICAL OFFICER (B1), to become vacant in January, 1942. Applicants should have held house appointments and had surgical experience. Preference will be given to candidates holding diploma of F.R.C.S. Suitably qualified R practitioners holding B2 or B1 appointments are invited to apply. Salary is at the rate of £252 per annum.

Applications, stating age, nationality, qualifications with dates, experience, and details of previous appointments, and accompanied by copies of three recent testimonials, should be sent to the undersigned forthwith.

ARTHUR R. CASH, General Superintendent.

15th December, 1941.

Corporation of Glasgow.

PUBLIC HEALTH DEPARTMENT.

Applications are invited for the post of MEDICAL SUPERINTENDENT of HAWKHEAD MENTAL HOSPITAL, CROOKSTON, near Glasgow. Salary £1000, rising by £60 biennially to maximum of £1300 per annum, together with emoluments valued at £150 per annum for purposes of Superannuation. Age under 45 years, unless already contributing to Superannuation under the Asylums Officers' Superannuation Act or other Local Authority Scheme.

Applications, stating exact date of birth, whether married or single, and giving full details of qualifications and experience in the treatment of mental diseases and mental hospital administration, together with copies of not more than three recent testimonials to be sent to the undersigned, in envelope marked "Hawkhead Mental Hospital—Appointment of Medical Superintendent," not later than Saturday, 10th January, 1942.

WILLIAM KERR, Town Clerk.

City Chambers, Glasgow, 16th December, 1941.

Appointment of Medical Officer to

IMPORTANT INDUSTRIAL CONCERN.

Applications are invited from Male and Female registered medical practitioners for the position of Second Medical Officer to a large Works in the West of England.

Administrative ability is essential.

The appointment is for whole-time service and no private practice will be permitted. Remuneration will be at the rate of £750 per annum, but some departure from this figure in either direction may be made when the qualifications and experience of an applicant are considered. Terms of contract will be discussed at the interview.

Applications in writing, giving full details of qualifications and experience, should be forwarded not later than 31st December to Address, No. 836, THE LANCET Office, 7, Adam-street, Adelphi London, W.C.2.

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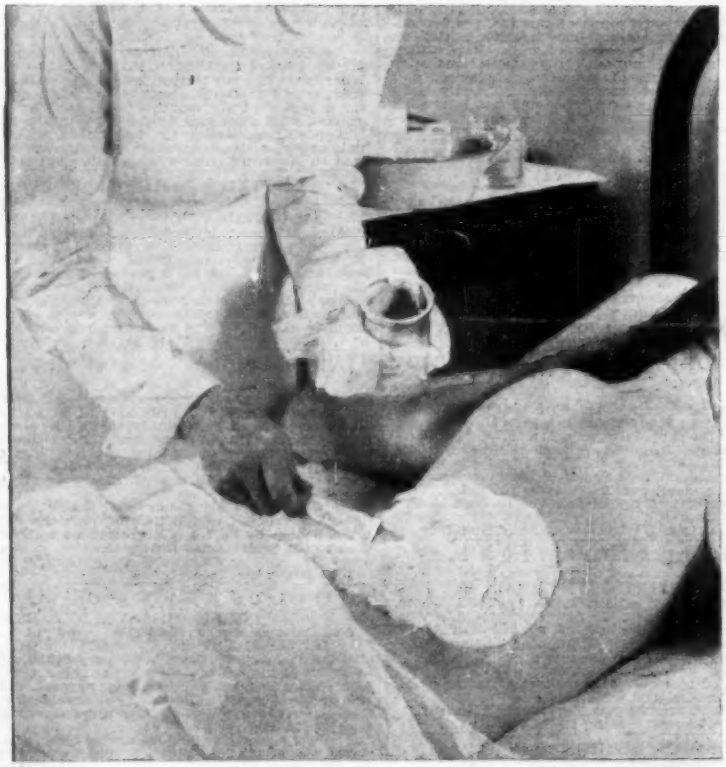

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